

## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Thursday, March 21, 2013 4:15 PM  
**To:** Pond, Greg; Jeroen.Gerritsen@tetrattech.com  
**Cc:** Jackson, Susank; Reynolds, Louis  
**Subject:** RE: populating the data template

Let's try for 9:30 am if Jeroen is available.

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**From:** Pond, Greg [mailto:Pond.Greg@epa.gov]  
**Sent:** Thursday, March 21, 2013 4:08 PM  
**To:** Van Ness, Keith; Jeroen.Gerritsen@tetrattech.com  
**Cc:** Jackson, Susank; Reynolds, Louis  
**Subject:** RE: populating the data template

Great news! I am available anytime tomorrow morning.

*Greg Pond*  
U.S. EPA Region III  
Office of Monitoring and Assessment  
Freshwater Biology Laboratory  
1060 Chapline St.  
Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

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**From:** Van Ness, Keith [mailto:Keith.VanNess@montgomerycountymd.gov]  
**Sent:** Thursday, March 21, 2013 4:04 PM  
**To:** Pond, Greg; Jeroen.Gerritsen@tetrattech.com  
**Cc:** Jackson, Susank; Reynolds, Louis  
**Subject:** RE: populating the data template

Hi Greg:

Jeroen is in West Virginia today – let's discuss tomorrow am? I do have the fish and bugs all ready to go now – even in a master list as Jeroen explained to me but have not put anything into the template yet.

Keith

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**From:** Pond, Greg [mailto:Pond.Greg@epa.gov]  
**Sent:** Thursday, March 21, 2013 3:47 PM  
**To:** 'Jeroen.Gerritsen@tetrattech.com'; Van Ness, Keith  
**Cc:** Jackson, Susank; Reynolds, Louis  
**Subject:** populating the data template

Jeroen and Keith, I was playing around trying to figure out how the template works and pasted the Montgomery Co. Master bug list into the Mn template. I had to re-organize the columns and add several blank phylogenetic fields (albeit empty) etc., to make it fit. It seemed to update each station tab with the new assignments (that is, attributes changed though they were still linked to Mn's sample bugs). The only bugaboo is that we are going to have to link up (in Access or whatever database) the new master taxa list and Keith's sample data from the 20 sites. There, the attributes will

populate each bug record from the samples. That is how the attribute "metrics" (at top of each worksheet) are calculated, since they are not taken from the Master taxa list directly. Was that comprehensible?

Keith, I can do this in the name of time...if I promise not to peak at the site lists. What do you think Jeroen, any hints? Will need to do this for the fish too.

*Greg Pond*

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## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Friday, March 29, 2013 10:26 AM  
**To:** Jackson, Susank; Pond, Greg; Symborski, Mark; Jeroen.Gerritsen@tetrattech.com  
**Cc:** Dolan, Mary; Dolan, Mary  
**Subject:** RE: Keith's mailbox is full RE: Question for Keith re availability of photos and prep of materials on BCG

Susan:

My email has been cleared out now - it fills up quickly.

Let me answer your questions and respond to them below. I am also including Mary Dolan in this email in case my responses need more information. Mary is putting all this information together for the presentation to the Planning Board and eventually to the County Council.

Also - thank all of you for this wonderful assistance! Listening to the spirited and lively discussions Wednesday and than seeing the consensus on the tier assignments based on expert insights and experience was remmarkable. I also do not see how Greg is still on his feet - I certainly was not at 100% Thursday.

Keith

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**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Fri 3/29/2013 9:36 AM  
**To:** Pond, Greg; Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Van Ness, Keith  
**Subject:** Keith's mailbox is full RE: Question for Keith re availability of photos and prep of materials on BCG

Mark: My email to Keith was returned because his mailbox is full - so he has not received my inquiries re photos etc. I will be out this morning and Greg is the primary contact to avoid redundancy in calls and emails from two of us! I will follow up with Greg later today and will be working with him to develop a report and communication materials. Jeroen is writing up the fish break out session today.

Susan Jackson

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**From:** Jackson, Susank  
**Sent:** Friday, March 29, 2013 8:52 AM  
**To:** Pond, Greg; Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Keith.VanNess (Keith.VanNess@montgomerycountymd.gov)  
**Subject:** Question for Keith re availability of photos and prep of materials on BCG



Keith,

Greg, Jeroen and I have been corresponding about preliminary report and communication materials for next week.

Some questions that will help us target your needs:

- 1) Do you have any readily available photos of the sites that were evaluated - for a high quality site, such as one of the sentinel sites, a moderate condition site comparable to BCG level 4 and a more disturbed sites such as one of the sites rated 5 or 6? If so, could you send those to us? Yes, will send them Monday.
- 2) Are there key points you heard that you would like highlighted in the report or communication materials? Yes (in my opinion) Where does Ten Mile place in the tier assignments and reasons given by the expert panel, How has the BCG been used by others not only to assign tiers but to manage streams, discuss if they are trending downwards or upwards.
- 3) What are the key points you think the Council needs to hear? This was a pilot but expert consensus from state, federal and local experts agreed on where Ten Mile should be assigned within a tier, the possible trend they saw in the tier placement, how the BCG can be applied to manage and better understand streams, the community structure and function of the biological communities can help us understand the water quality of these streams.
- 4) Is MD DNR (Scott Stranko) following up with information for you re the Brook Trout and other key fishery/habitat considerations? If I recall correctly, at the end of the meeting on Wednesday he was discussing what they could do to support this effort and could provide you some key information. Yes - we will be following up with Scott and Matt Stover as well - I need to send Matt the Brook trout report from the 1980's or 90's
- 5) Can you share with us the agenda and materials you want to present to the county. Based on what I heard, the biological information is one aspect of a larger presentation. Having an understanding of overall approach and information to be presented will provide a helpful context - as in how this information fits into the whole story you and Mark are presenting. Susan - this should come from Mary Dolan and/or Mark. In the meantime you can glean the information presented on the web page they have put up about this effort.  
[http://www.montgomeryplanning.org/community/plan\\_areas/1270\\_corridor/clarksburg/clarksburg\\_lim\\_amendment.sh](http://www.montgomeryplanning.org/community/plan_areas/1270_corridor/clarksburg/clarksburg_lim_amendment.sh)  
tm

If this request is redundant with what you have heard from Greg, ignore and reply to him. We are working quickly and when that happens, there is a danger for bumping into each other! Nothing is redundant on this effort! The Council has



put this on such a fast track, I am amazed that Mary, Val and Mark are still on their feet. To all - I am home today - my home number is 301-845-4450 if anyone needs a quick response as my typing is atrociously slow.

Susan Jackson

---

From: Pond, Greg  
Sent: Thursday, March 28, 2013 1:34 PM  
To: Jackson, Susank; Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; mstover@mde.state.md.us; cluckett@mde.state.md.us; Keith.VanNess (Keith.VanNess@montgomerycountymd.gov); efriedman@dnr.state.md.us; aleslie@umd.edu; ndziepak@dnr.state.md.us; cmswan@umbc.edu; agriggs@icprb.org  
Subject: RE: BCG--3 more sites please?

Good question! This shouldn't take more than 5 minutes per site (15 total), so hopefully if folks can get these back to me by tomorrow (Friday), that would be best.

I think Epeorus, Sweltsa (and other chloroperlids) were the ones that might have persuaded a few of us to bump those 3+ to a ~2.

I got home at 11:30 last night, so from Silver Spring it took 6 hrs. Luckily no rain or snow.

Greg Pond

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1060 Chapline St.

Wheeling, WV 26003

Ph: 304-234-0243

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From: Jackson, Susank  
Sent: Thursday, March 28, 2013 12:56 PM  
To: Pond, Greg; Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; mstover@mde.state.md.us; cluckett@mde.state.md.us; Keith.VanNess (Keith.VanNess@montgomerycountymd.gov); efriedman@dnr.state.md.us; aleslie@umd.edu; ndziepak@dnr.state.md.us; cmswan@umbc.edu; agriggs@icprb.org  
Subject: RE: BCG--3 more sites please?

Time frame? Today, tomorrow? Monday?

I am amazed at your commitment here, after driving 4 to 5 hours home last night.

Thank you Greg!

Also, there were two organisms that a number of the group mentioned they were looking for in order to consider a site at BCG level 2. Can you remind me what these organisms were? One of the reviewers (I think either Alan or Matt) mentioned they would expect to see at least 6 or 7 individuals in a BCG level 2 site.

Susan

From: Pond, Greg  
Sent: Thursday, March 28, 2013 12:22 PM  
To: Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; mstover@mde.state.md.us; cluckett@mde.state.md.us; Keith.VanNess (Keith.VanNess@montgomerycountymd.gov); efriedman@dnr.state.md.us; Jackson, Susank; aleslie@umd.edu; ndziepak@dnr.state.md.us; cmswan@umbc.edu; agriggs@icprb.org  
Subject: BCG--3 more sites please?

Dear bug friends. Thanks you for your participation yesterday. I am sending 3 more sites. If you can, please take a look (remembering your process) and email me your tier choice and a brief description of why. You do not have to send me back the spreadsheet, just the tier and description for Samp021, 022, and 023.

Thank you!!

Greg Pond

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## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Tuesday, April 02, 2013 12:52 PM  
**To:** Jackson, Susank; Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning  
**Attachments:** BCG report\_rough draft\_April 1KDV.docx

Susan:

Attached are edits and comments on JUST the results and conclusions. In my opinion this report does more than 'hit the spot' – it provides an example of what the BCG could provide as a tool as we all struggle with land use decisions. It is a real improvement over our local IBI I think.

Now working on the other parts of the report.

Keith

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**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Tuesday, April 02, 2013 12:02 PM  
**To:** Van Ness, Keith; Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

NO, not too late. It is important that we hear from you re whether this report hits the spot as a preliminary draft. Please take a look at results and conclusions.

Per Mary's request, we will work on graphics.

Susan

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**From:** Van Ness, Keith [mailto:Keith.VanNess@montgomerycountymd.gov]  
**Sent:** Tuesday, April 02, 2013 11:16 AM  
**To:** Pond, Greg; Jackson, Susank; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

To All:

I too am feeling the effects of the tremendous need to provide information in a short time! Whew – but it is very rewarding at the same time to be able to produce something very useful and understandable at many levels in such a timely manner. Kudos to all of you!

This is very interesting and also very useful in describing streams in the county. When we first created the index, we noted that there was a tight cluster of reference station b-ibi scores at the top of the scoring range. Almost 50% of the reference station scores scored between 36 to 40 points out of a possible 40 point maximum. After that – there was no other observable cluster of scores. So – in discussion with Wayne Davis – we viewed that top cluster as the 'best of the best' or 'excellent'. We trisected the remaining scores of 35 to 8 into the other narrative categories.

I think that the BCG picked up on this trisection approach. The tier assignments improves the depiction of the decline in the biological community in a way that is complimentary to the IBI and also (I think) more sensitive to the IBI scoring

ranges that we currently use. It would be good to continue with the BCG development by using more data and see if this observation continues.

I just got the draft document and will forward the report to Meo. Is it too late to review it?

Exciting stuff.

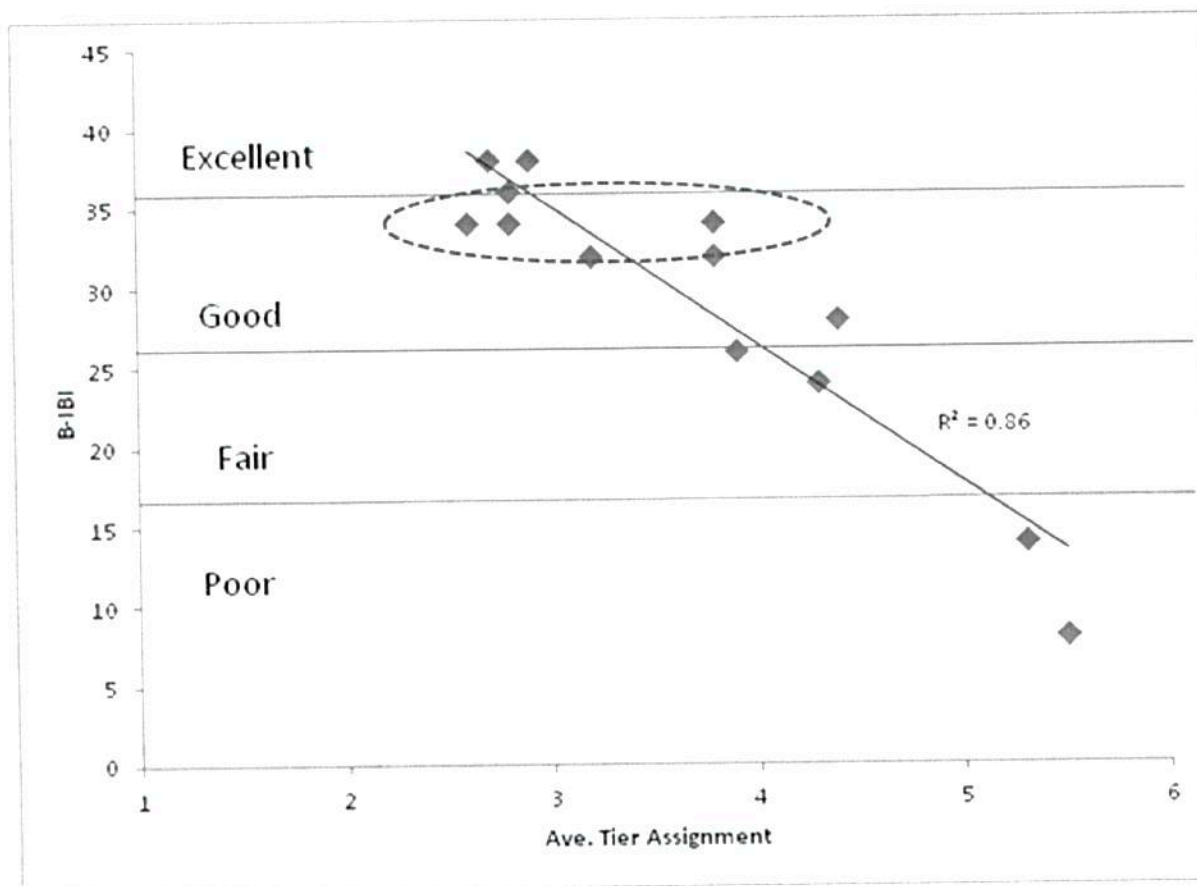
Thanks

Keith

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**From:** Pond, Greg [<mailto:Pond.Greg@epa.gov>]  
**Sent:** Tuesday, April 02, 2013 9:27 AM  
**To:** Jackson, Susank; Dolan, Mary  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

Something interesting to me (this is preliminary) is the relationship between tier assignments (e.g., averaged by converting 3- to 3.5, etc.) and Montgomery Co. B-IBI. A good relationship is seen with bugs (the 3 extra Sentinel sites are not included here) but in the high "good" part of the graph, the experts perceived a shift from 2.7 to almost 4. Food for thought. I will be looking at fish IBI next.



Greg Pond  
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1060 Chapline St.  
Wheeling, WV 26003



---

**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Monday, April 01, 2013 1:10 PM  
**To:** Pond, Greg  
**Cc:** Jackson, Susank; Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** Photos

Greg:

Here are some stream stations – hopefully they are illustrative of different habitat conditions. Bank001 – urban stream, img0059 – ag stream, hw308b – very nice stream, LSTM110 is a headwater stream in Ten Mile.  
Keith



Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

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**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Monday, April 01, 2013 5:25 PM  
**To:** Jackson, Susank; Pond, Greg  
**Cc:** Symborski, Mark  
**Subject:** RE: Photos

Susan-

I'm leaving soon, are you sending something today? I'll either look at it later this evening from home or early in the morning.

Mary

---

**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Monday, April 01, 2013 4:55 PM  
**To:** Dolan, Mary; Jackson, Susank; Pond, Greg  
**Cc:** Curtis, Meosotis; Symborski, Mark  
**Subject:** RE: Photos

Still alive. Still here!

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**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Monday, April 01, 2013 4:54 PM  
**To:** Jackson, Susank; Van Ness, Keith; Pond, Greg  
**Cc:** Curtis, Meosotis; Symborski, Mark  
**Subject:** RE: Photos

Mark and I are still in the office. I don't know about Keith.

Mary

---

**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]  
**Sent:** Monday, April 01, 2013 4:51 PM  
**To:** Van Ness, Keith; Pond, Greg  
**Cc:** Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** RE: Photos

Hello Keith and Mark,

Greg and I are near finish with a very rough draft of the report. Greg just had his phone lines taken down (repair work) so he is offline at the moment. We are writing up results and at least bulleting key conclusions.

I can send to you all shortly if you are still in office. Would like your feedback on whether we are heading in the right direction. Or, if too late, can send first thing in the morning. We plan to revise and clean up this very preliminary report before sending to you at end of the day tomorrow but wanted some initial feedback.

Susan



Ph: 304-234-0243

[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

---

**From:** Jackson, Susank

**Sent:** Tuesday, April 02, 2013 8:57 AM

**To:** Pond, Greg; Dolan, Mary

**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis

**Subject:** Some edits on draft report\_will follow up with Greg later this morning

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Also, supporting data for results needed to be added at some point, perhaps in appendix. For example, one of the results cites the before and after results for a few of the 10 mile sites. This additional work may need to be added following the initial draft to be provided to Montgomery County by COB today.

Greg: I will follow up with you later this morning.

Susan

---

**From:** Pond, Greg

**Sent:** Monday, April 01, 2013 8:23 PM

**To:** Dolan, Mary; Jackson, Susank

**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis

**Subject:** Draft BCG report and Appendix B.

Mary, Mark, and Keith:

Attached is a rough draft report that Susan, Jeroen, and I have been working on. We basically ran out of steam for now, but will be interested in your feedback and additions that dovetail into something meeting expectations for your hopes for a BCG and Tenmile Creek in particular. There are numerous placeholders for more information we need to flesh out (and Keith, you will see your name mentioned a few times and highlighted in yellow!). We think it would be great to have site photos across the tiers with description of impervious area, etc., and then photos of key indicator taxa (e.g., Attributes I-III).

This has been a very interesting BCG exercise but we've never had to turn something around in a just a few days time like this. We would very much like to continue to work on BCG development for Montgomery Co., and this pilot has been a good start.

Please take a look and let us know where you'd like us to take this.

Greg

*Greg Pond*

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## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Monday, April 01, 2013 1:03 PM  
**To:** Pond, Greg  
**Cc:** Jackson, Susank; Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** Photos  
**Attachments:** Copy of RedSalamander3.JPG

Greg:  
I'll be sending the images over in batches so as not to blow up email boxes. This first one is a northern red salamander. The presence and absence of the salamanders helped several of the vertebrate folks to place the stations into the BCG tiers.  
Keith





## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Monday, April 01, 2013 1:05 PM  
**To:** Pond, Greg  
**Cc:** Jackson, Susank; Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** Photos  
**Attachments:** eel.jpg; Rosyside\_dace.jpg

Greg:

The next 2 images are fish – rosyside dace and American eel.

Keith



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**To:** Pond, Greg  
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**Subject:** Photos  
**Attachments:** bank001.jpg; IMG\_0059.JPG; hw308b2001.jpg; LSTM110\_Downstream\_138.JPG

Greg:  
Here are some stream stations – hopefully they are illustrative of different habitat conditions. Bank001 – urban stream, img0059 – ag stream, hw308b – very nice stream, LSTM110 is a headwater stream in Ten Mile.  
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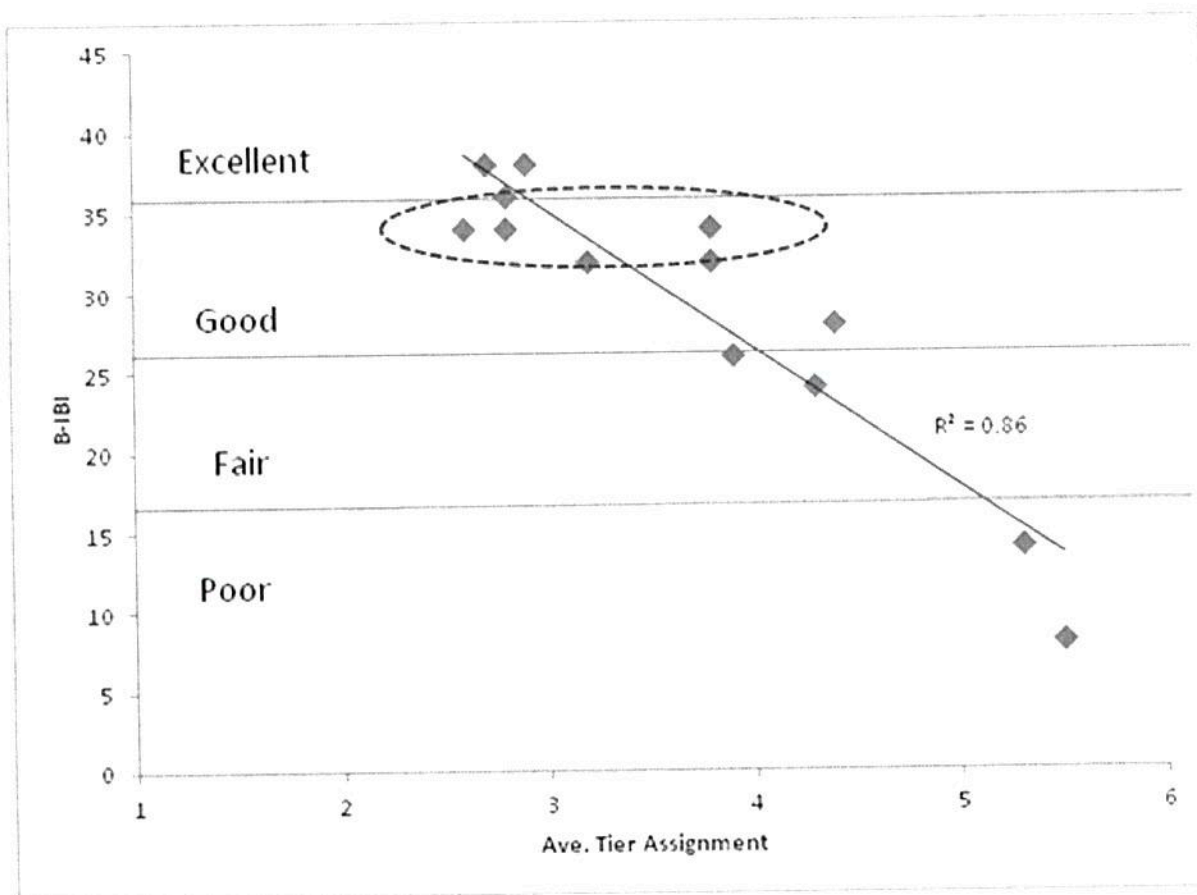
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**Sent:** Monday, April 01, 2013 4:54 PM

**To:** Jackson, Susank; Van Ness, Keith; Pond, Greg

**Cc:** Curtis, Meosotis; Symborski, Mark

**Subject:** RE: Photos

Mark and I are still in the office. I don't know about Keith.

Mary

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**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]

**Sent:** Monday, April 01, 2013 4:51 PM

**To:** Van Ness, Keith; Pond, Greg

**Cc:** Curtis, Meosotis; Dolan, Mary; Symborski, Mark

**Subject:** RE: Photos

Hello Keith and Mark,

Greg and I are near finish with a very rough draft of the report. Greg just had his phone lines taken down (repair work) so he is offline at the moment. We are writing up results and at least bulleting key conclusions.

I can send to you all shortly if you are still in office. Would like your feedback on whether we are heading in the right direction. Or, if too late, can send first thing in the morning. We plan to revise and clean up this very preliminary report before sending to you at end of the day tomorrow but wanted some initial feedback.

Susan

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**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]

**Sent:** Monday, April 01, 2013 1:10 PM

**To:** Pond, Greg

**Cc:** Jackson, Susank; Curtis, Meosotis; Dolan, Mary; Symborski, Mark

**Subject:** Photos

Greg:

Here are some stream stations – hopefully they are illustrative of different habitat conditions. Bank001 – urban stream, img0059 – ag stream, hw308b – very nice stream, LSTM110 is a headwater stream in Ten Mile.

Keith



## **Biological Condition Gradient:**

### **A Headwater Stream Catchment in the Northern Piedmont Region, Montgomery County, Maryland**



**Ten Mile Creek Expert Panel**

**Draft Report, April X, 2013**

## Executive Summary



## Table of Contents

# **Preliminary Report: Northern Piedmont Biological Condition Gradient for Montgomery County, Maryland**

## **Chapter 1. Incorporating Biological Assessments into Water Quality Management**

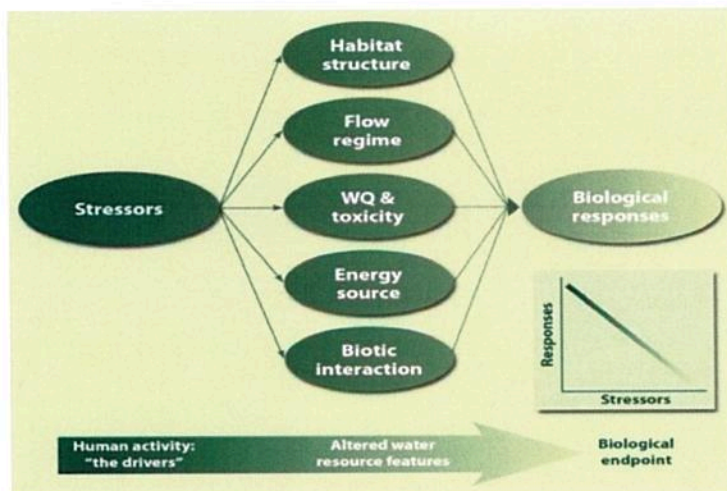
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### **1.1 Why Is Measuring Biological Condition Important?**

Biological assessments can be used to directly measure the overall biological integrity of an aquatic community and the synergistic effects of stressors on the aquatic biota residing in a waterbody where there are well-developed biological assessment programs (Figure 1-1) (USEPA 2003). Resident biota function as continual monitors of environmental quality, increasing the sensitivity of our assessments by providing a continuous measure of exposure to stressors and access to responses from species that cannot be reared in the laboratory. This increases the likelihood of detecting the effects of episodic events (e.g., spills, dumping, treatment plant malfunctions), toxic nonpoint source (NPS) pollution (e.g., agricultural pesticides), cumulative pollution (i.e., multiple impacts over time or continuous low-level stress), nontoxic mechanisms of impact (e.g., trophic structure changes due to nutrient enrichment), or other impacts that periodic chemical sampling might not detect. Biotic response to impacts on the physical habitat such as sedimentation from stormwater runoff and physical habitat alterations from dredging, filling, and channelization can also be detected using biological assessments.



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Figure 1-1. Biological assessments provide information on the cumulative effects on aquatic communities from multiple stressors. Figure courtesy of David Allen, University of Michigan.

## 1.2. The Biological Condition Gradient (BCG)

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Over the past 40 years, states have independently developed technical approaches to assess biological condition and set designated aquatic life uses for their waters. The BCG was designed to provide a means to map different indicators on a common scale of biological condition to facilitate comparisons between programs and across jurisdictional boundaries in context of the CWA. The Biological Condition Gradient (BCG) is a conceptual, narrative model that describes how biological attributes of aquatic ecosystems change along a gradient of increasing anthropogenic stress. It provides a framework for understanding current conditions relative to natural, undisturbed conditions (Figure 1). Some states, such as Maine and Ohio, have used a framework similar to the BCG to more precisely define their designated aquatic life uses, monitor status and trends, and track progress in restoration and protection (USEPA 810-R-11). These two states and many others have used biological assessments and BCG-like models to support water quality managements over several decades. Based on these efforts, the BCG was designed to provide a means to map different indicators on a common scale of biological condition to facilitate comparisons between programs and across jurisdictional boundaries in context of the CWA. (case studies 3.1 and 3.5).

USEPA worked with biologists from across the United States to develop the BCG conceptual model (Davies and Jackson 2006), which The BCG shows an ecologically based relationship between the stressors affecting a waterbody (the physical, chemical, biological impacts) and the response of the aquatic community, manifested as the biological condition. The model is consistent with ecological theory and can be adapted or calibrated to reflect specific geographic regions and waterbody type (e.g., streams, rivers, wetlands, estuaries, lakes). Approaches to calibrate the BCG to region-, state-, or tribe-specific conditions have been applied in several ecological regions by multiple states and tribes.

In practice, the BCG is used to first identify the critical attributes of an aquatic community (see Table 2-2) and then describe how each attribute changes in response to stress. Practitioners can use the BCG to interpret biological condition along a standardized gradient regardless of assessment method and apply that information to different state or tribal programs. For example, Pennsylvania is using the BCG calibrated to its streams to identify exceptional and high-quality waters of the state, based on biological condition (exceptional waters may also be identified with other criteria, say, scenic or recreational value).

The BCG is divided into six levels of biological conditions along the stressor-response curve, ranging from observable biological conditions found at no or low levels of stress (level 1) to those found at high levels of stress (level 6) (Figure 1-2):

**Level 1.** Native structural, functional, and taxonomic integrity is preserved; ecosystem function is preserved within range of natural variability. Level 1 describes waterbodies that are pristine, or biologically indistinguishable from pristine condition.

**Level 2.** Virtually all native taxa are maintained with some changes in biomass and/or abundance; ecosystem functions are fully maintained within the range of natural variability.

**Level 3.** Some changes in structure due to loss of some highly sensitive native taxa; shifts in relative abundance of taxa but sensitive-ubiquitous taxa are common and abundant; ecosystem functions are fully maintained through redundant attributes of the system, but may differ quantitatively.



**Level 4.** Moderate changes in structure due to replacement of sensitive-ubiquitous taxa by more tolerant taxa, but reproducing populations of some sensitive taxa are maintained; overall balanced distribution of all expected major groups; ecosystem functions largely maintained through redundant attributes.

**Level 5.** Sensitive taxa are markedly diminished; conspicuously unbalanced distribution of major groups from that expected; organism condition shows signs of physiological stress; system function shows reduced complexity and redundancy; increased buildup or export of unused organic materials.

**Level 6.** Extreme changes in structure; wholesale changes in taxonomic composition; extreme alterations from normal densities and distributions; organism condition ing is often poor (e.g. diseased individuals may be prevalent); ecosystem functions are severely altered.

## The Biological Condition Gradient: Biological Response to Increasing Levels of Stress

### Levels of Biological Condition

**Level 1.** Natural structural, functional, and taxonomic integrity is preserved.

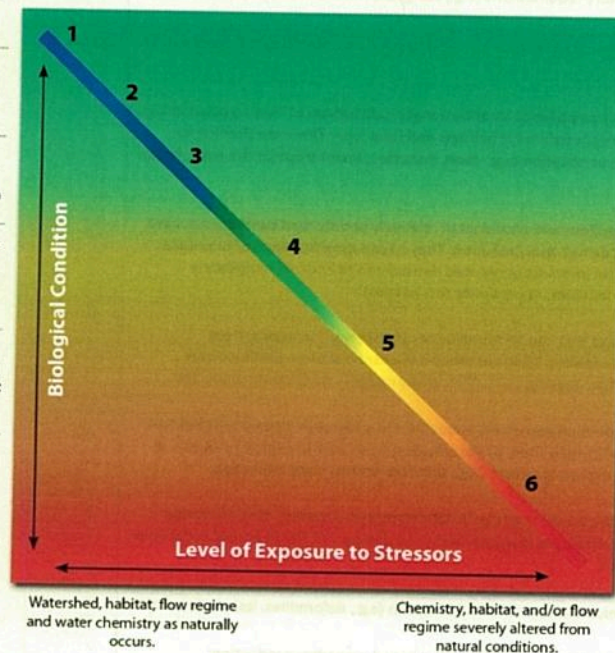
**Level 2.** Structure & function similar to natural community with some additional taxa & biomass; ecosystem level functions are fully maintained.

**Level 3.** Evident changes in structure due to loss of some rare native taxa; shifts in relative abundance; ecosystem level functions fully maintained.

**Level 4.** Moderate changes in structure due to replacement of some sensitive ubiquitous taxa by more tolerant taxa; ecosystem functions largely maintained.

**Level 5.** Sensitive taxa markedly diminished; conspicuously unbalanced distribution of major taxonomic groups; ecosystem function shows reduced complexity & redundancy.

**Level 6.** Extreme changes in structure and ecosystem function; wholesale changes in taxonomic composition; extreme alterations from normal densities.



Source: Modified from Davies and Jackson 2006

Figure 1-2. The Biological Condition gradient (BCG).

The scientific panels that developed the BCG conceptual model identified 10 attributes of aquatic ecosystems that change in response to increasing levels of stressors along the gradient, from level 1 to 6 (see Table 1). The attributes include several aspects of community structure, organism condition, ecosystem function, spatial and temporal attributes of stream size, and connectivity.

Each attribute provides some information about the biological condition of a waterbody. Combined into a model like the BCG, the attributes can offer a more complete picture about current waterbody conditions and also provide a basis for comparison with naturally expected waterbody conditions. All states and tribes that have applied a BCG used the first seven attributes that describe the composition and structure of biotic community on the basis of the tolerance of species to stressors and, where available, included information on the presence or absence of native and nonnative species and, for fish and amphibians, observations on overall condition (e.g., size, weight, abnormalities, tumors).

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**Table 1. Biological and other ecological attributes used to characterize the BCG.**

Attribute	Description
I. Historically documented, sensitive, long-lived, or regionally endemic taxa	Taxa known to have been supported according to historical, museum, or archeological records, or taxa with restricted distribution (occurring only in a locale as opposed to a region), often due to unique life history requirements (e.g., sturgeon, American eel, pupfish, unionid mussel species).
II. Highly sensitive (typically uncommon) taxa	Taxa that are highly sensitive to pollution or anthropogenic disturbance. Tend to occur in low numbers, and many taxa are specialists for habitats and food type. These are the first to disappear with disturbance or pollution (e.g., most stoneflies, brook trout [in the east], brook lamprey).
III. Intermediate sensitive and common taxa	Common taxa that are ubiquitous and abundant in relatively undisturbed conditions but are sensitive to anthropogenic disturbance/pollution. They have a broader range of tolerance than Attribute II taxa and can be found at reduced density and richness in moderately disturbed sites (e.g., many mayflies, many darter fish species).
IV. Taxa of intermediate tolerance	Ubiquitous and common taxa that can be found under almost any conditions, from undisturbed to highly stressed sites. They are broadly tolerant but often decline under extreme conditions (e.g., filter-feeding caddisflies, many midges, many minnow species).
V. Highly tolerant taxa	Taxa that typically are uncommon and of low abundance in undisturbed conditions but that increase in abundance in disturbed sites. Opportunistic species able to exploit resources in disturbed sites. These are the last survivors (e.g., tubificid worms, black bullhead).
VI. Nonnative or intentionally introduced species	Any species not native to the ecosystem (e.g., Asiatic clam, zebra mussel, carp, European brown trout). Additionally, there are many fish native to one part of North America that have been introduced elsewhere.
VII. Organism condition	Anomalies of the organisms; indicators of individual health (e.g., deformities, lesions, tumors).
VIII. Ecosystem function	Processes performed by ecosystems, including primary and secondary production; respiration; nutrient cycling; decomposition; their proportion/dominance; and what components of the system carry the dominant functions. For example, shift of lakes and estuaries to phytoplankton production and microbial decomposition under disturbance and eutrophication.
IX. Spatial and temporal extent of detrimental effects	The spatial and temporal extent of cumulative adverse effects of stressors; for example, groundwater pumping in Kansas resulting in change in fish composition from fluvial dependent to sunfish.
X. Ecosystem connectance	Access or linkage (in space/time) to materials, locations, and conditions required for maintenance of interacting populations of aquatic life; the opposite of fragmentation. For example, levees restrict connections between flowing water and floodplain nutrient sinks (disrupt function); dams impede fish migration, spawning. Extensive burial of headwater streams leads to cumulative downstream impacts to biota through energy input disruption, habitat modification, and loss of refugia and dispersing colonists

Source: Modified from Davies and Jackson 2006.

The last three BCG attributes of ecosystem function, connectance, and spatial and temporal extent of detrimental effects can provide valuable information when evaluating the potential for a waterbody to be protected or restored. For example, a manager can choose to target resources and restoration activities to a stream where there is limited spatial extent of stressors or there are adjacent intact wetlands and stream buffers or intact hydrology versus a stream with comparable biological condition but where adjacent wetlands have been recently eliminated, hydrology is being altered, and stressor input is predicted to increase.

The BCG model provides a framework to help water quality managers do the following:

- Decide what environmental conditions are desired (goal-setting)—The BCG can provide a framework for organizing data and information and for setting achievable goals for waterbodies relative to “natural” conditions, e.g., condition comparable or close to undisturbed or minimally disturbed condition.
- Interpret the environmental conditions that exist (monitoring and assessment)—managers can get a more accurate picture of current waterbody conditions.
- Plan for how to achieve the desired conditions and measure effectiveness of restoration—The BCG framework offers water program managers a way to help evaluate the effects of stressors on a waterbody, select management measures by which to alleviate those stresses, and measure the effectiveness of management actions.
- Communicate with stakeholders—When biological and stress information is presented in this framework, it is easier for the public to understand the status of the aquatic resources relative to what high-quality places exist and what might have been lost.

Summarizing/Concluding paragraph to be added

### Calibrating the Conceptual Model to Local Conditions

The BCG can serve as a starting point for defining the response of aquatic biota to increasing levels of stress in a specific region. The model can be applied to any region or waterbody by calibrating it to local conditions using specific expertise and local data. To date, most states and tribes are calibrating the BCG using the first seven attributes that characterize the biotic community primarily on the basis of tolerance to stressors, presence/absence of native and nonnative species, and organism condition.

A multistep process is followed to calibrate a BCG to local conditions (Figure 1-32); to describe the native aquatic assemblages under natural conditions; to identify the predominant regional stressors; and to describe the BCG, including the theoretical foundation and observed assemblage response to stressors. Calibration begins with the assembly and analysis of biological monitoring data. Next, a calibration workshop is held in which experts familiar with local conditions use the data to define the ecological attributes and set narrative statements; for example, narrative decision rules for assigning sites to a BCG level on the basis of the biological information collected at sites. Documentation of expert opinion in assigning sites to tiers is a critical part of the process. A decision model can then be developed that encompasses those rules and is tested with independent data sets. A decision model based on the tested decision rules is a transparent, formal, and testable method for documenting and validating expert knowledge. A quantitative data analysis program can then be developed using those rules.

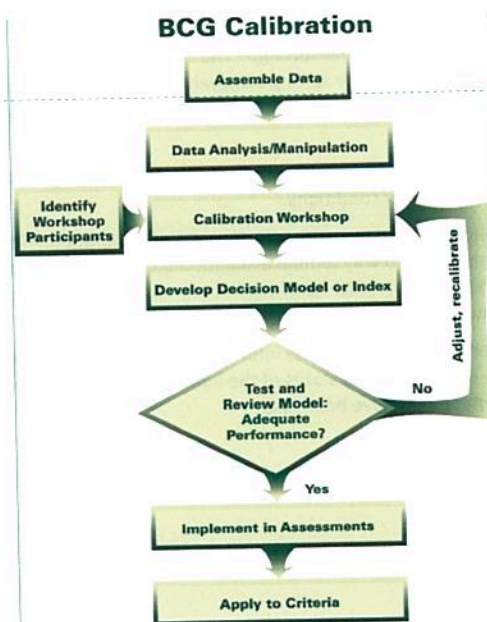


Figure 1-32. Steps in a BCG calibration.

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Commented [g2]: I say keep it in.

### BCG Development for Montgomery County

Montgomery County convened a panel of 17 technical experts consisting of stream and fisheries biologists and aquatic ecologists to develop a BCG conceptual model for the Piedmont region of Maryland (see list of panel members). The panel participated in several webinars/ conference calls, and an all-day panel meeting on March 27, 2013. The objective was to develop a BCG narrative model, including narrative descriptions of the BCG levels as they are manifested in the Piedmont region of Maryland, and using data collected by Montgomery County.

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[Keith: add more on workshop/panel, MoCo objectives if necessary] - to provide context for why this pilot was conducted

## History of Montgomery County Streams

[Keith] a paragraph or two, or three, if you think helpful to set the context

### Identifying BCG Attributes

Biologists have long observed that taxa differ in their sensitivity to pollution and disturbance. While biologists largely agree on the relative sensitivity of taxa, there may be subtle differences among stream types (high vs. low gradient) or among geographic regions. The workgroup participants used their collective experience and judgment to assign sensitivities of the organisms to the disturbance gradient. Participants discussed the fish and benthic macroinvertebrates that occur in Montgomery County and in Maryland's Piedmont, and developed a consensus assignment prior to the workshop. Examples are shown in Tables 2 and 3, and Figure 3.

Table 2. Examples of [Northern Piedmont](#) fish and salamanders by attribute group.

Ecological Attribute	Number of species	Example Species
I Endemic, rare	5	Brook trout, bridge shiner, Chesapeake logperch, Maryland darter, trout perch
II Highly Sensitive	7	Yellow perch, northern hogsucker, margined madtom, dusky salamander, longtailed salamander
III Intermediate Sensitive	11	Fallfish, fantail darter, Potomac sculpin, Blue Ridge sculpin
IV Intermediate Tolerant	14	Channel catfish, least brook lamprey, pumpkinseed, tessellated darter
V Tolerant	13	American eel, mummichog, white sucker, sea lamprey, northern two-lined salamander
VI-i Sensitive Nonnative	2	brown trout, rainbow trout
VI-m Intermediate nonnative	6	Black crappie, golden redhorse, smallmouth bass
VI-t Tolerant nonnative	6	common carp, goldfish, green sunfish, largemouth bass, snakehead
x unassigned		Unidentified fish, hybrids

Table 3. Examples of Northern Piedmont benthic macroinvertebrates by attribute group.

Ecological Attribute	Number of taxa	Example Species
I Endemic, rare		None attributed
II Highly Sensitive	~50	Mayflies: <i>Habrophlebia</i> , <i>Epeorus</i> , <i>Ephemera</i> , <i>Leucrocuta</i> , <i>Habrophlebiodes</i> , <i>Paraleptophlebia</i> , Stoneflies: <i>Sweltsa</i> , <i>Talloperla</i> , <i>Eccopectura</i> , Caddisflies: <i>Wormaldia</i> , <i>Diplectrona</i> , <i>Rhyacophila</i> , <i>Dolophilodes</i> , Flies: <i>Dixa</i> , <i>Prodiamesinae</i>
III Intermediate Sensitive	~60	Mayflies: <i>Diphetera</i> , <i>Ephemerella</i> , <i>Ameletus</i> , <i>Serratella</i> , Stoneflies: <i>Amphinemura</i> , <i>Acroneuria</i> , <i>Leuctra</i> , <i>Isoperla</i> , Dragonflies: <i>Cordulegaster</i> , <i>Lanthus</i> , Caddisflies: <i>Neophylax</i> , <i>Rhyacophila</i> , <i>Pycnopsyche</i> , <i>Glossosoma</i> , Beetles: <i>Oulimnius</i> , <i>Anchytarsus</i> , Flies: <i>Diamesinae</i> , <i>Hexatoma</i> , <i>Prosimulium</i>
IV Intermediate Tolerant	>100	Mayflies: <i>Baetis</i> , <i>Stenonema</i> , Damsel and Dragonflies: <i>Calopteryx</i> , <i>Boyeria</i> , Caddisflies: <i>Hydropsyche</i> , <i>Polycentropus</i> , Beetles: <i>Helichus</i> , <i>Optioservus</i> , Fishflies: <i>Nigronia</i> , Other: <i>Chelifera</i> , <i>Tanytarsini</i> , <i>Tipula</i> , <i>Tabanidae</i> , <i>Crangonyx</i> , <i>Enchytraeidae</i>
V Tolerant	>50	Beetles: <i>Hydrophilidae</i> , <i>Dytiscidae</i> , Flies: <i>Hemerodromia</i> , most <i>Chironomini</i> and <i>Orthoclaudiinae</i> , <i>Stratiomyiidae</i> , Other: <i>Isopoda</i> , <i>Physidae</i> , <i>Hirudinae</i> , <i>Tubificidae</i>
V Nonnative	2	Asian Clam: <i>Corbicula</i> , Snails: <i>Bithynia</i>
x Unassigned		Ambiguous family-level or order-level identifications, unknown tolerance

Potential spot for photos Keith sent??

Figure 3. Sensitive aquatic species in Maryland's Piedmont [Keith, MoCo — see fish graphics provided, you can assemble a nice picture]

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## Expert Elicitation Solicitation: Determining BCG Levels

Panelists examined biological data from individual sites and assigned those samples to Levels 1 to 6 of the BCG. The intent was to achieve consensus and, in the process, to document the scientific rationale identify preliminary rules that experts were using to make their assignments. EXpert solicitation is the first step in a rigorous, transparent process to develop quantifiable rules for decisionmaking and model development. The end result is the refinement of existing, or development of new, biological indices. Though the first step in a longer process, expert evaluation of changes in taxa, in-stream and riparian habitat, and watershed condition can yield immediate detail and insight on the response of local and regional biota to increasing stress. This information can be used to identify high quality waters that maybe threatened and require additional protection and waters that show early signs of degradation but where protection or restoration efforts could be most efficient and successful.

The data that the experts examined when making BCG level assignments were provided in worksheets. The worksheets contained lists of taxa, taxa abundances, BCG attribute levels assigned to the taxa, BCG attribute metrics and limited site information (e.g., such as watershed area), size class (i.e., headwater), and stream gradient. Participants were not allowed to view Station IDs or waterbody names when making BCG level assignments, as this might bias their assignments. Fish and macroinvertebrate worksheets can be found in Appendix ~~XXC~~ (to be added).

The workgroup examined macroinvertebrate data from ~~13~~ 16 samples, and fish data from 17 samples. The group was able to reach a consensus opinion on the BCG level assignments for all sites reviewed. The panels were able to distinguish 4 separate BCG levels (BCG Levels 3-6), although Level 6 (extreme degradation) was rare. The experts also identified significant changes in assemblages the indicated shifts either up or down along the gradient. For example, tThe fish groupEach group identified a single sample that was borderline between Levels 2 and 3, that is, half of the experts assessed the samples at Level 2 \_ and half at Level 3+ . All \_and all agreed that these e-sites were borderline between the two levels because of excellent habitat and water quality conditions and potential for these sites to support native or other sensitive species that were currently missing e.g. brook trout. The macroinvertebrate group identified three samples that they considered borderline Level 2-3 because the expected sensitive and native taxa were either absent or present in low numbers and the in-stream habitat and water quality were judged sufficient or close to sufficient to support these taxa. Additionally, the level of disturbance in the immediate watershed area was low and restoration potential for these sites judged excellent.

A summary description of each level is given in Table 4. We note below the transitions between levels; that is, what is lost from a higher level to a lower level. The descriptions of the transitions become the basis for development of narrative decision criteria for assigning sites to BCG levels.

**Level 1 – Level 2. Natural Conditions (undisturbed to minimally disturbed).** The panel felt that Level 1 sites, which are indistinguishable from pristine or undisturbed, would have strictly native taxa for all assemblages evaluated (fish, salamander, benthic macroinvertebrates) with no ~~(or almost no)~~ non-natives present, some endemic species, and evidence of connectivity in the form of migratory fish.

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Suggest delete, unless define what "almost no" means



~~Invasions.~~ The presence of by non-native species and loss of endemic species would move a site to the next level down on the gradient, Level 2. However, there are no sites within the piedmont that do not have some degree of disturbance, including legacy effects from agriculture and forestry from 100 to 200 years ago. This is typical situation for most of the North American continent. For practical reasons, Level 1 and highly rated level 2 (e.g. 2+) have been combined. These sites have excellent water quality and support habitat critical for native taxa. For macroinvertebrates, Level 2+ sites would have many highly sensitive taxa and relatively high richness and abundance of intermediate sensitive-ubiquitous taxa. Many of these taxa are characterized by having limited dispersal capabilities or are habitat specialists. Tolerant taxa are present but have low abundance. Presence of sensitive-rare, cold water indicator taxa such as the mayfly *Epeorus*, and stoneflies *Sweltsa* and *Talpoidea* would be expected to occur.

**Level 2 – Level 3 Near Natural (minimally disturbed).** For fish, the panel decided that non-native species may be present, but they cannot exclude native species. A site that would be assigned to Level 2 fish community must also maintain connectivity between the mainstem, associated wetlands and headwater streams so that migratory fish and amphibians (e.g. eel, lamprey, salamanders) are present or known to access the site; and must have. Native native-top predators (e.g. brook trout) are present in Piedmont streams. The best fish site (upper Patuxent River) lacked brook trout, but reintroduction of reproducing native brook trout and access for migratory fish would raise this site to Level 2 status. Several sites rated as BCG level 3 supported habitat and water quality that would support a reproducing native brook population. This sites would then be rated as a level 2, Several other Level 3 sites could also be raised to Level 2 by reintroduction of native brook trout.

**Level 3 Near Natural Habitat (loss of native taxa).** Level 3 condition was generally considered a good quality condition by the panel. For macroinvertebrates, Level 3 sites should have several highly sensitive taxa (some loss compared to Level 2) and relatively high richness and abundance of intermediate sensitive-ubiquitous taxa. Taxa with intermediate tolerance may increase in richness and abundance. Tolerant taxa are somewhat more common but still have low abundance. Key sensitive taxa include the caddisfly *Diplectrona*, the mayfly *Ephemerella* and the stonefly *Amphinemura*. Panelists expected other key taxa to indicate Level 2 streams, especially coldwater indicator mayflies, stoneflies, and caddisflies (e.g. *Epeorus*, *Sweltsa*, and *Wormaldia*).

**Level 3 – Level 4.** For fish, the transition from Level 3 to Level 4 is characterized by increasing loss of sensitive species, and by increased abundance of tolerant species indicating nutrient enrichment and/or excess sedimentation. Level 3 condition was generally considered good by the panel but neither very good nor exceptional (Levels 1 and 2). For macroinvertebrates, panelists agreed that as sites slipped toward Level 4, that highly sensitive macroinvertebrate taxa were more poorly represented but some intermediate sensitive-ubiquitous taxa populations were maintained. Although cool and coldwater indicator taxa such as *Dolophilodes*, *Diplectrona* and *Leuctra* are usually present, obvious increases in intermediate-tolerance and tolerant individuals were noted when compared to Level 2-3, driven primarily by increases in specific chironomid midgefly subfamilies.

**Commented [S7]:** The community does not maintain connectivity.

**Commented [S8]:** Herring??? I heard a couple of folks mention herring

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Level 4 Significant Changes in Aquatic Biota (Moderately Disturbed). Sensitive species and individuals are still present but in reduced numbers (e.g. approximately 10 – 30% of the community rather than 60 to 80%). The experts generally agree that the persistence of some sensitive species indicates that their original ecosystem function is still maintained albeit at a reduced level. (Add example representative of such a shift in Piedmont).

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Level 4 – Level 5. The panel considered sites rated towards the lower end of Level 4 (e.g. approximately 10 - 15% of the sensitive species present) to be trending towards to be near a tipping point above a markedly diminished aquatic community characteristic of the next level down, Level 5. Tolerant taxa predominant and sensitive species are either absent or present in very low numbers irretrievable loss represented by Level 5. Though not part of this evaluation, there can be increased evidence of physiological stress (examples you might see in Piedmont?). Most notably in fish and amphibian communities, lesions, tumors, and other abnormalities are increasingly observed.

Level 5 Major Changes in Aquatic Biota (High level of disturbance). Level 4 retains a sizable minority of sensitive species and individuals (approximately 10 – 30% of the community) reflecting that the component is still fulfilling some ecosystem function albeit at a reduced level. In Level 5, sensitive species and individuals may be present but their presence is reduced to negligible quantity in terms of a functional role is negligible component of within the system. Those sensitive taxa remaining are highly ubiquitous ones within the region having very good dispersal capabilities. For macroinvertebrates, streams trending toward Level 5 revealed that highly sensitive macroinvertebrate taxa were usually absent and Chironomid midges (mostly tolerant Orthoclaadiinae and Chironomini) often comprised >50% of the community in Level 5 streams. Level 5 typically has abundant organisms that are mostly tolerant or intermediate tolerance, both native and introduced, and may have relatively high diversity within the tolerant organisms. Macroinvertebrate communities could have high or low overall diversity, but most representatives are opportunistic or pollution tolerant species.

Commented [S11]: Alteration?

Level 5 – Level 6. Both Level 5 and Level 6 are below a tipping point, and whether they can be restored is unknown. Level 5 typically has abundant organisms that are mostly tolerant or intermediate tolerance, both native and introduced, and may have relatively high diversity within the tolerant organisms. Macroinvertebrate communities could have high or low overall diversity, but most representatives are opportunistic or pollution tolerant species. Transition from level 5 to level 6 is characterized by loss of remaining diversity to a depauperate community. Some highly tolerant organisms such as fathead minnows, brown bullhead, rat-tailed maggots, various maggot genera, tubificid and naidid worms, or physid snails may be highly very abundant, indicating extreme organic enrichment and hypoxia; or extreme low abundance and low richness of all organisms may indicate toxic conditions. Under hypoxic conditions, only those tolerant invertebrates adapted to living in low dissolved oxygen or can breathe atmospheric air may be present.

Level 6. Add description of what is observed in Piedmont.



## Results

**Status:** A preliminary BCG based on benthic macroinvertebrates, fish and salamander assemblages has been developed (Appendx B).

The panelists working with the fish and salamander assemblages rated the 17 selected sites from BCG Level 3+ to 6. The 16 macroinvertebrate sites were rated roughly from 2- to 6+. Where both sets of sites overlapped (sites with both assemblages), there was relatively good agreement. For example, at Samp002 the fish experts rated the site a 4 while the macroinvertebrate experts rated it as a 3-. Similarly, Samp012 was rated a 6+ by fish panelists and a 5- by macroinvertebrate specialists. At Samp004, both groups of panelists rated the site a solid Level 3. The rationale for assignment of each sample was documented and among the assemblage groups, there was consistent agreement on basis for the assignments. The rationale for the assignments becomes the basis for development of narrative decision rules to BCG level assignment. In turn, with further testing and peer review, these narrative statements then become the basis for quantification and development of numeric biological indices or models.

Ten Mile Creek sites ratings ranged between the high end of BCG level 3 (e.g. a 3+) to BCG level 4. For most BCG level development done to date, sites that are comparable to BCG level 4 are often judged as attaining their designated aquatic life use. Several of the Ten Mile Creek sites, particularly the primary head water streams, were judged as very good quality, receiving a low BCG level 2 rating (e.g. 2-) or high BCG level 3 rating (e.g. 3+). The experts felt that these streams have excellent potential for improvement to BCG level 2 if protected with options for additional protection considered.

The information provided by each of the assemblages was complementary, each providing additional insight into the current condition as well as potential for restoration. For example, for several sites there were cool and cold water sensitive benthic macroinvertebrate taxa present as well as sensitive salamander species. The native brook trout were not present at these sites but because of the presence of these other assemblages indicative of good water quality and habitat, these streams may be able to support a self-sustaining native brook trout population and be a candidate for an upgrade from their current use class, class # 1, to class # 3. These sites are approaching and may achieve conditions comparable to Northern Piedmont Sentinel sites that, as of this date, occur only outside of the county.

**Trends:** Some of the sites were split into "before and after" sets that were rated by both groups. Samp006 was a 1.3 sq. mi. stream that was initially sampled in 1998 prior to extensive urbanization. The site was re-sampled in 2012. Macroinvertebrates changed from a Level 2+ stream to a 4-; some highly sensitive, cool and coldwater invertebrate taxa (*Diplectrona*, *Dolophilodes*, *Eccoptura*) and some intermediate sensitive taxa (e.g., *Ephemerella*) were eradicated following urbanization. For fish, this site changed from a 3 to a 3- with similar species but large increases in abundance of the tolerant Blacknose Dace.

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Commented [S12]: Were these 10 mile creek samples? No.

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Commented [KVN13]: The groups did not know that the sites were split into "before and after" sets until after the rating was completed.



More to be added ...

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## Conclusion (straw, for Greg to work on tonight once his internet is up and running).

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The results of this pilot showed a remarkable level of agreement among the experts (Montgomery County, MDE, MDNR, USEPA, and University of Maryland) and across assemblages (benthic macroinvertebrates, fish and salamander). Further refinement and analysis are planned this spring and summer, including evaluation of independent data sets but the preliminary findings show that:

- 1) The individual expert judgments of the biological condition of the Ten Mile Creek sites ranged between high to fair quality (BCG levels 2- to level 4) with average score of XXXX. The highest quality Ten Mile Creek sites was the King Spring Tributary where the primary headwater streams that supported cold and cool water sensitive, native benthic macroinvertebrate taxa. The experts predicted that this site, among the other highest rated sites, these sites were excellent candidates for protection. A cursory evaluation of watershed condition indicate the area immediate to these streams have no or low road density and impervious surface.

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Commented [S14]: Greg – I do not recall which sites were 10 mile and which were not – so not sure if Ten Mile sites included the primary headwater streams which received ratings from 2- to 3+ from the individual experts.

Commented [S15]: Greg or Keith – can you confirm that the primary headwater sites were 10 mile creek? One of the headwater site was in Ten Mile.

- 2) Three of some of the sites were sampled before and after land use disturbance and changes in the assemblages were consistently identified by the experts and results in lower BCG level assignments. Greg – can you provide examples of what the changes were? Also, Keith, can you remind us what the land use disturbance was? All three sites came from County Special Protection Areas (SPA) – one in the Upper Paint Branch, one in the Piney Branch and one in the Clarksburg Master Plan. The land use disturbance resulted from the conversion of rolling piedmont fields and forests to residential development of different levels of imperviousness.

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- 3) High quality Northern Piedmont sites showed potential for restoration of self-reproducing native brook trout populations and potentially are candidates for a use upgrade. MDE and MDNR offered to work with Montgomery County to further document and investigate this possibility.

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Commented [S16]: If my memory serves me correctly, some of these sites were 10 mile creek. Greg, please confirm.

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- 4) The information from the three different assemblages (benthic macroinvertebrates, fish, salamanders) were complementary and provided strong evidence for identifying high quality conditions and detecting early response to stress. In particular, the presence of sufficient numbers of sensitive, cold and cool weather benthic invertebrates and sensitive salamander are robust indicators of high quality conditions, including sites that could support the return of native brook trout. Additionally, certain fish taxa such as eels, herring, or sea lamprey are indicative of streams that are not disconnected from the mainstem river and the Chesapeake Bay. These fish species migrate from coastal waters up through the rivers and into the streams.

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- 5) The experts discussed the use of a Northern Piedmont BCG as a framework for communicating to the public and their officials detailed information on the biota that is being protected or restored (current conditions); predicted biological gains from management actions; and tracking progress once actions taken. This framework will help develop a BCG using quantitatively robust data from the Northern Piedmont of Maryland that could materially assist local efforts to describe risk in different development and land use options as well as restoration opportunities.

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## APPENDIX A (TO BE ADDED)

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### SELECTED CASE EXAMPLES FROM PRIMER

## APPENDIX B

### NORTHERN PIEDMONT REGION BIOLOGICAL CONDITION GRADIENT

(SENT AS SEPARATE FILE UNLESS GREG CAN ADD TO THIS DOCUMENT  
AND KEEP AS LANDSCAPE. I TRIED AND COULD NOT GET THE FORMAT  
RIGHT. CAN GET HELP TOMORROW TO DO SO)

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## APPENDIX C

### Expert Solicitation Workshop Materials (to be added)



## Jackson, Susank

---

**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Tuesday, April 02, 2013 11:21 AM  
**To:** Pond, Greg; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Passmore, Margaret  
**Cc:** Symborski, Mark; Jackson, Susank; Dolan, Mary; Curtis, Eileen; Curtis, Meosotis  
**Subject:** RE: BCG vs IBI

To all:  
In my opinion, the BCG could materially assist our efforts to describe risk in different development and land use options. I do agree that this is a great benefit of the BCG.

Please don't be so hard on the bug group – their transcriber was a local yokel that couldn't type very well and was SLOW.

Thanks  
Keith

---

**From:** Pond, Greg [mailto:Pond.Greg@epa.gov]  
**Sent:** Tuesday, April 02, 2013 11:06 AM  
**To:** Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Van Ness, Keith; Passmore, Margaret  
**Cc:** Symborski, Mark; Jackson, Susank; Dolan, Mary  
**Subject:** BCG vs IBI

Here are some comparisons to contemplate. Jeroen, I ended up converting + and – into decimals and then averaged across panelists for each site. Slides 1 and 2 are just bugs within attributes to graphically show what panelists were thinking about. In graphs 3 and 4, these compare IBI to Tiers where decent relationships are found. Interestingly, there is fairly wide scatter of what experts found at “good IBI” sites (see dashed ovals in “good” range). So experts indicated sites were increasingly at risk but IBI says all was still good. This is a great benefit of BCG. Look where the Ten Mile Cr. sites fall out. Also, see relationship of Fish tiers to bug tiers; unfortunately n=11 because bug group didn't finish enough sites to match fish sites.

Curious of your thoughts.

*Greg Pond*  
U.S. EPA Region III  
Office of Monitoring and Assessment  
Freshwater Biology Laboratory  
1060 Chapline St.  
Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)





## Jackson, Susank

---

**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Tuesday, April 02, 2013 12:52 PM  
**To:** Jackson, Susank; Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning  
**Attachments:** BCG report\_rough draft\_April 1KDV.docx

Susan:

Attached are edits and comments on JUST the results and conclusions. In my opinion this report does more than 'hit the spot' – it provides an example of what the BCG could provide as a tool as we all struggle with land use decisions. It is a real improvement over our local IBI I think.

Now working on the other parts of the report.

Keith

---

**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Tuesday, April 02, 2013 12:02 PM  
**To:** Van Ness, Keith; Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

NO, not too late. It is important that we hear from you re whether this report hits the spot as a preliminary draft. Please take a look at results and conclusions.

Per Mary's request, we will work on graphics.

Susan

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**To:** Pond, Greg; Jackson, Susank; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
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To All:

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This is very interesting and also very useful in describing streams in the county. When we first created the index, we noted that there was a tight cluster of reference station b-ibi scores at the top of the scoring range. Almost 50% of the reference station scores scored between 36 to 40 points out of a possible 40 point maximum. After that – there was no other observable cluster of scores. So – in discussion with Wayne Davis – we viewed that top cluster as the 'best of the best' or 'excellent'. We trisected the remaining scores of 35 to 8 into the other narrative categories.

I think that the BCG picked up on this trisection approach. The tier assignments improves the depiction of the decline in the biological community in a way that is complimentary to the IBI and also (I think) more sensitive to the IBI scoring

ranges that we currently use. It would be good to continue with the BCG development by using more data and see if this observation continues.

I just got the draft document and will forward the report to Meo. Is it too late to review it?

Exciting stuff.

Thanks

Keith

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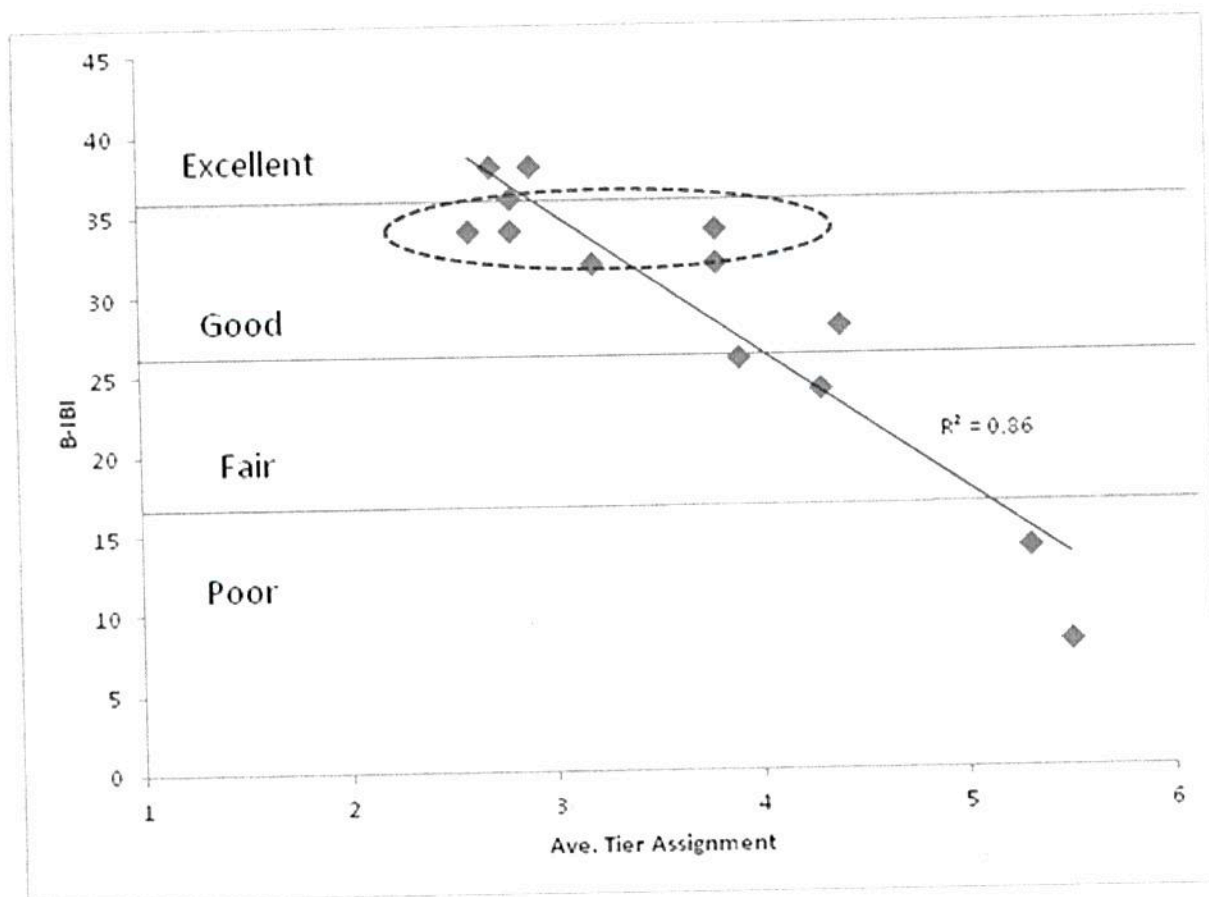
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**To:** Jackson, Susank; Dolan, Mary

**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis

**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

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**From:** Jackson, Susank  
**Sent:** Tuesday, April 02, 2013 8:57 AM  
**To:** Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** Some edits on draft report\_will follow up with Greg later this morning

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Also, supporting data for results needed to be added at some point, perhaps in appendix. For example, one of the results cites the before and after results for a few of the 10 mile sites. This additional work may need to be added following the initial draft to be provided to Montgomery County by COB today.

Greg: I will follow up with you later this morning.

Susan

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**From:** Pond, Greg  
**Sent:** Monday, April 01, 2013 8:23 PM  
**To:** Dolan, Mary; Jackson, Susank  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** Draft BCG report and Appendix B.

Mary, Mark, and Keith:

Attached is a rough draft report that Susan, Jeroen, and I have been working on. We basically ran out of steam for now, but will be interested in your feedback and additions that dovetail into something meeting expectations for your hopes for a BCG and Tenmile Creek in particular. There are numerous placeholders for more information we need to flesh out (and Keith, you will see your name mentioned a few times and highlighted in yellow!). We think it would be great to have site photos across the tiers with description of impervious area, etc., and then photos of key indicator taxa (e.g., Attributes I-III).

This has been a very interesting BCG exercise but we've never had to turn something around in a just a few days time like this. We would very much like to continue to work on BCG development for Montgomery Co., and this pilot has been a good start.

Please take a look and let us know where you'd like us to take this.

Greg

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Wheeling, WV 26003

Ph: 304-234-0243

[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

---

**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]

**Sent:** Monday, April 01, 2013 5:25 PM

**To:** Jackson, Susank; Pond, Greg

**Cc:** Symborski, Mark

**Subject:** RE: Photos

Susan-

I'm leaving soon, are you sending something today? I'll either look at it later this evening from home or early in the morning.

Mary

---

**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]

**Sent:** Monday, April 01, 2013 4:55 PM

**To:** Dolan, Mary; Jackson, Susank; Pond, Greg

**Cc:** Curtis, Meosotis; Symborski, Mark

**Subject:** RE: Photos

Still alive. Still here!

---

**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]

**Sent:** Monday, April 01, 2013 4:54 PM

**To:** Jackson, Susank; Van Ness, Keith; Pond, Greg

**Cc:** Curtis, Meosotis; Symborski, Mark

**Subject:** RE: Photos

Mark and I are still in the office. I don't know about Keith.

Mary

---

**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]

**Sent:** Monday, April 01, 2013 4:51 PM

**To:** Van Ness, Keith; Pond, Greg

**Cc:** Curtis, Meosotis; Dolan, Mary; Symborski, Mark

**Subject:** RE: Photos

Hello Keith and Mark,

Greg and I are near finish with a very rough draft of the report. Greg just had his phone lines taken down (repair work) so he is offline at the moment. We are writing up results and at least bulleting key conclusions.

I can send to you all shortly if you are still in office. Would like your feedback on whether we are heading in the right direction. Or, if too late, can send first thing in the morning. We plan to revise and clean up this very preliminary report before sending to you at end of the day tomorrow but wanted some initial feedback.

Susan

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**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Monday, April 01, 2013 1:10 PM  
**To:** Pond, Greg  
**Cc:** Jackson, Susank; Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** Photos

Greg:  
Here are some stream stations – hopefully they are illustrative of different habitat conditions. Bank001 – urban stream, img0059 – ag stream, hw308b – very nice stream, LSTM110 is a headwater stream in Ten Mile.  
Keith



## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Tuesday, April 02, 2013 1:45 PM  
**To:** Jackson, Susank; Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning  
**Attachments:** BCG report\_rough draft\_April 1KDV.docx

To All: Please see page 11 for a draft on the MoCo objectives – please edit as needed. It may be too wordy.  
Thanks  
Keith

**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Tuesday, April 02, 2013 12:02 PM  
**To:** Van Ness, Keith; Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
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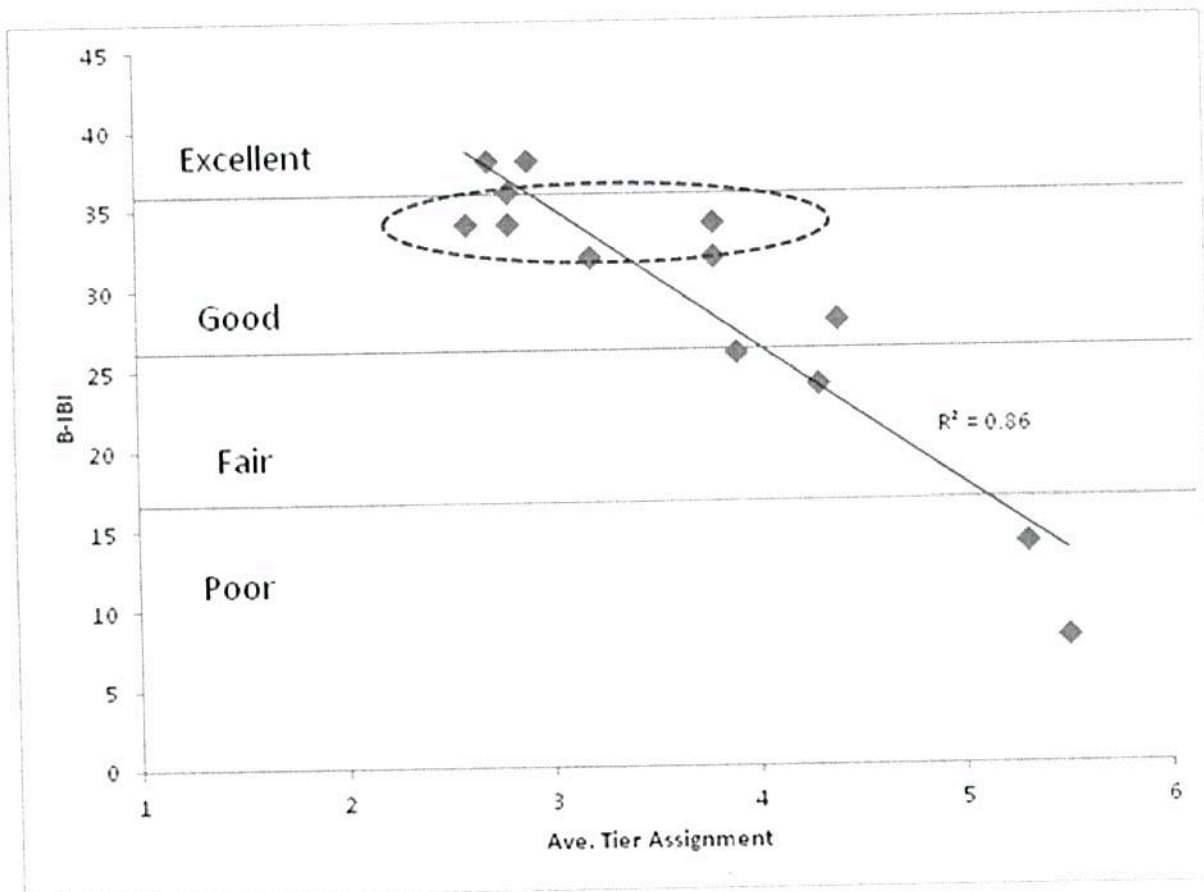
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**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning  
**Attachments:** BCG report\_rough draft\_April 1KDV.docx

To All: My last edits – I didn't find that a history of streams in the county materially helped the report – tried a short couple of paras. and thought it strayed from the content of the report. Also – provided a few possible examples of physiological stress observed in urban streams for Greg and Lou to consider. Look forward to the final report – you all are great and I hope this starts a BCG process for Maryland.  
Keith

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**From:** Van Ness, Keith  
**Sent:** Tuesday, April 02, 2013 1:45 PM  
**To:** 'Jackson, Susank'; Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

To All: Please see page 11 for a draft on the MoCo objectives – please edit as needed. It may be too wordy.  
Thanks  
Keith

---

**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]  
**Sent:** Tuesday, April 02, 2013 12:02 PM  
**To:** Van Ness, Keith; Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

NO, not too late. It is important that we hear from you re whether this report hits the spot as a preliminary draft. Please take a look at results and conclusions.

Per Mary's request, we will work on graphics.

Susan

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**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Tuesday, April 02, 2013 11:16 AM  
**To:** Pond, Greg; Jackson, Susank; Dolan, Mary  
**Cc:** Symborski, Mark; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis; Curtis, Meosotis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

To All:

I too am feeling the effects of the tremendous need to provide information in a short time! Whew – but it is very rewarding at the same time to be able to produce something very useful and understandable at many levels in such a timely manner. Kudos to all of you!

This is very interesting and also very useful in describing streams in the county. When we first created the index, we noted that there was a tight cluster of reference station b-ibi scores at the top of the scoring range. Almost 50% of the reference station scores scored between 36 to 40 points out of a possible 40 point maximum. After that – there was no other observable cluster of scores. So – in discussion with Wayne Davis – we viewed that top cluster as the ‘best of the best’ or ‘excellent’. We trisected the remaining scores of 35 to 8 into the other narrative categories.

I think that the BCG picked up on this trisection approach. The tier assignments improves the depiction of the decline in the biological community in a way that is complimentary to the IBI and also (I think) more sensitive to the IBI scoring ranges that we currently use. It would be good to continue with the BCG development by using more data and see if this observation continues.

I just got the draft document and will forward the report to Meo. Is it too late to review it?

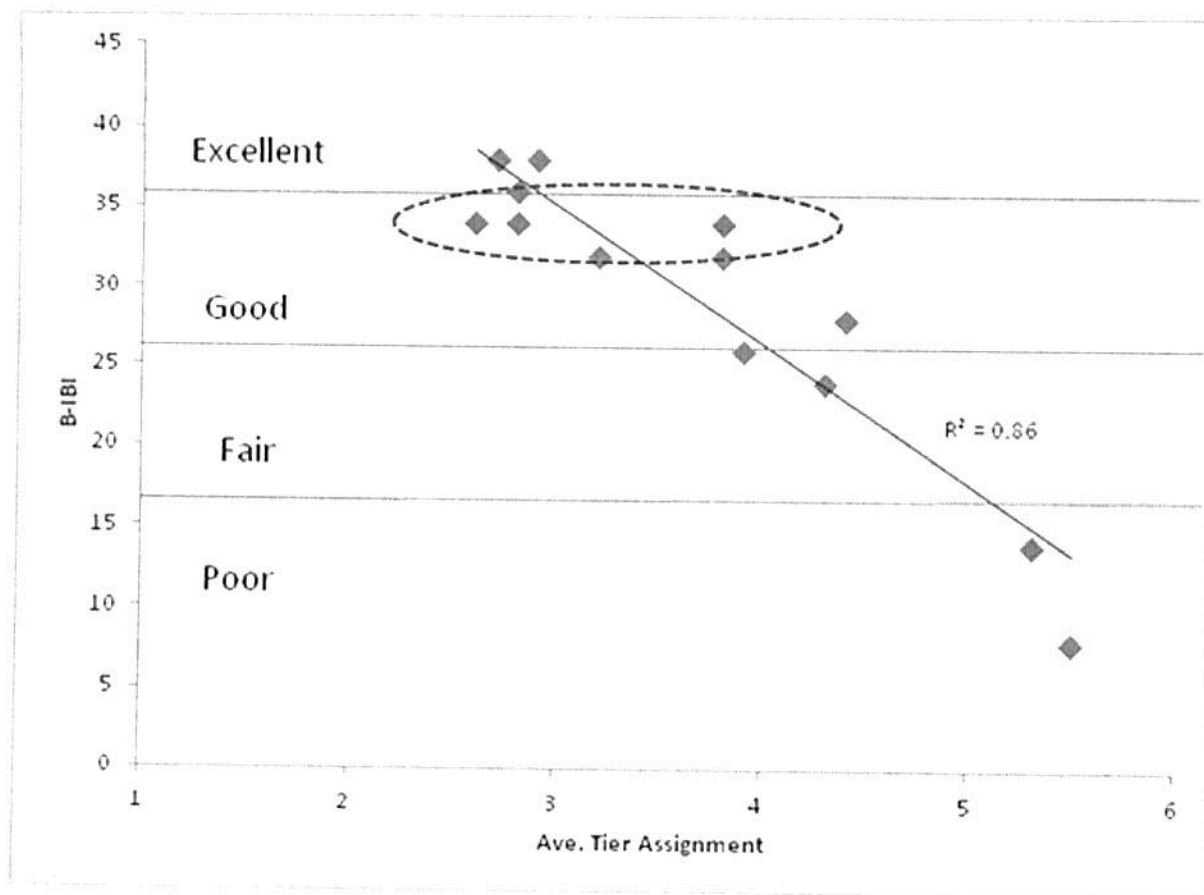
Exciting stuff.

Thanks  
Keith

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**From:** Pond, Greg [<mailto:Pond.Greg@epa.gov>]  
**Sent:** Tuesday, April 02, 2013 9:27 AM  
**To:** Jackson, Susank; Dolan, Mary  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

Something interesting to me (this is preliminary) is the relationship between tier assignments (e.g., averaged by converting 3- to 3.5, etc.) and Montgomery Co. B-IBI. A good relationship is seen with bugs (the 3 extra Sentinel sites are not included here) but in the high “good” part of the graph, the experts perceived a shift from 2.7 to almost 4. Food for thought. I will be looking at fish IBI next.



Greg Pond  
 U.S. EPA Region III  
 Office of Monitoring and Assessment  
 Freshwater Biology Laboratory  
 1060 Chapline St.  
 Wheeling, WV 26003  
 Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

**From:** Jackson, Susank  
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**To:** Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
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Attached is a quick and dirty edited draft report - minor comments and an additional bullet for the conclusion. A few questions are in there for Greg or Keith. There are some placeholders for text to be added later today.

Preliminary feedback is requested from Keith, Mark and Mary whether the content and format of this report is what is needed. If there are key points and recommendations from the workshop that are missing and you think are needed, please specify. I can prepare a couple of slides today using the photos Keith provided if that is of help.

Also, supporting data for results needed to be added at some point, perhaps in appendix. For example, one of the results cites the before and after results for a few of the 10 mile sites. This additional work may need to be added following the initial draft to be provided to Montgomery County by COB today.

Greg: I will follow up with you later this morning.



Susan

---

**From:** Pond, Greg  
**Sent:** Monday, April 01, 2013 8:23 PM  
**To:** Dolan, Mary; Jackson, Susank  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** Draft BCG report and Appendix B.

Mary, Mark, and Keith:

Attached is a rough draft report that Susan, Jeroen, and I have been working on. We basically ran out of steam for now, but will be interested in your feedback and additions that dovetail into something meeting expectations for your hopes for a BCG and Tenmile Creek in particular. There are numerous placeholders for more information we need to flesh out (and Keith, you will see your name mentioned a few times and highlighted in yellow!). We think it would be great to have site photos across the tiers with description of impervious area, etc., and then photos of key indicator taxa (e.g., Attributes I-III).

This has been a very interesting BCG exercise but we've never had to turn something around in a just a few days time like this. We would very much like to continue to work on BCG development for Montgomery Co., and this pilot has been a good start.

Please take a look and let us know where you'd like us to take this.

Greg

*Greg Pond*  
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Wheeling, WV 26003  
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[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

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**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Monday, April 01, 2013 5:25 PM  
**To:** Jackson, Susank; Pond, Greg  
**Cc:** Symborski, Mark  
**Subject:** RE: Photos

Susan-

I'm leaving soon, are you sending something today? I'll either look at it later this evening from home or early in the morning.

Mary

---

**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Monday, April 01, 2013 4:55 PM  
**To:** Dolan, Mary; Jackson, Susank; Pond, Greg

**Cc:** Curtis, Meosotis; Symborski, Mark  
**Subject:** RE: Photos

Still alive. Still here!

---

**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Monday, April 01, 2013 4:54 PM  
**To:** Jackson, Susank; Van Ness, Keith; Pond, Greg  
**Cc:** Curtis, Meosotis; Symborski, Mark  
**Subject:** RE: Photos

Mark and I are still in the office. I don't know about Keith.

Mary

---

**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]  
**Sent:** Monday, April 01, 2013 4:51 PM  
**To:** Van Ness, Keith; Pond, Greg  
**Cc:** Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** RE: Photos

Hello Keith and Mark,

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I can send to you all shortly if you are still in office. Would like your feedback on whether we are heading in the right direction. Or, if too late, can send first thing in the morning. We plan to revise and clean up this very preliminary report before sending to you at end of the day tomorrow but wanted some initial feedback.

Susan

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**Sent:** Monday, April 01, 2013 1:10 PM  
**To:** Pond, Greg  
**Cc:** Jackson, Susank; Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** Photos

Greg:

Here are some stream stations – hopefully they are illustrative of different habitat conditions. Bank001 – urban stream, img0059 – ag stream, hw308b – very nice stream, LSTM110 is a headwater stream in Ten Mile.

Keith



## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Tuesday, April 02, 2013 3:15 PM  
**To:** Jackson, Susank  
**Subject:** RE: Some edits on draft report\_will follow up with Greg later this morning

Susan:

I apologize! This went to my overflow folder and I did not see it until just now. Hopefully, my edits did not cause more stress to you all.

---

**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Tuesday, April 02, 2013 1:06 PM  
**To:** Van Ness, Keith  
**Subject:** FW: Some edits on draft report\_will follow up with Greg later this morning

If not too late, can you finish your review on the attached, a slightly updated version of the report?

If not, no worry. I can transcribe. Please note the additional bullet I added to the conclusion.

Susan

---

**From:** Jackson, Susank  
**Sent:** Tuesday, April 02, 2013 8:57 AM  
**To:** Pond, Greg; Dolan, Mary  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
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**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
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Mary, Mark, and Keith:



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Please take a look and let us know where you'd like us to take this.

Greg

*Greg Pond*  
U.S. EPA Region III  
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**Cc:** Symborski, Mark  
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**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Monday, April 01, 2013 4:55 PM  
**To:** Dolan, Mary; Jackson, Susank; Pond, Greg  
**Cc:** Curtis, Meosotis; Symborski, Mark  
**Subject:** RE: Photos

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**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Monday, April 01, 2013 4:54 PM  
**To:** Jackson, Susank; Van Ness, Keith; Pond, Greg  
**Cc:** Curtis, Meosotis; Symborski, Mark  
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Mary

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**Sent:** Monday, April 01, 2013 4:51 PM  
**To:** Van Ness, Keith; Pond, Greg  
**Cc:** Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** RE: Photos

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I can send to you all shortly if you are still in office. Would like your feedback on whether we are heading in the right direction. Or, if too late, can send first thing in the morning. We plan to revise and clean up this very preliminary report before sending to you at end of the day tomorrow but wanted some initial feedback.

Susan

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**Sent:** Monday, April 01, 2013 1:10 PM  
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**Cc:** Jackson, Susank; Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** Photos

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Keith



## Jackson, Susank

---

**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Wednesday, April 03, 2013 9:22 AM  
**To:** Jackson, Susank; Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

Susan and Greg:

I received it – just got in the office to find it in my inbox. I look forward to reading it.

Thanks all

Keith

---

**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Wednesday, April 03, 2013 9:17 AM  
**To:** Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis  
**Subject:** Please confirm you received the email with attachments

I had a horrendous tussle with Workplace trying to get the draft report and attachments sent - took me 25 minutes to get this down between the system freezing and booting me out.

Please confirm if you have received the report and successful in opening.

Susan Jackson

---

**From:** Jackson, Susank  
**Sent:** Wednesday, April 03, 2013 9:14 AM  
**To:** Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis  
**Subject:** Draft Report and attachments

Good morning. Attached is the draft report with two attachments (BCG and IBI comparison and Appendix B).

The report is preliminary. Your review comments are requested. We would like to finalize this report over the next month based on review by you and by the panelists.

Keith - can you review this report with a focus on the results and conclusions, provide us comments and then we can send to the expert panel for their review. Please email directly to Greg Pond and cc me. Greg is the "go to" technical person for this effort.

Both Greg and I will be available by email today if there are any changes or questions any of you on this draft. You may have some questions, edits or requests for further information for your meeting with the planning board tomorrow.

One last thing: If I recall correctly, there is a meeting next week. If you need a more final document by next week, please let us know. We can get the current draft cleaned abit more as well as the attachment formatted and incorporated directly into the body of the report. We would just need to know the timeframe.

Susan Jackson  
US EPA Biological Criteria Program

---





## Jackson, Susank

---

**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Wednesday, April 03, 2013 9:47 AM  
**To:** Pond, Greg; Dolan, Mary; Jackson, Susank  
**Cc:** Symborski, Mark; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

If I can help let me know – I think you and Susan have earned several weeks of well deserved rest. Again – thanks for all of this work – the report exceeds everything that I had hoped for!

Thanks  
Keith

---

**From:** Pond, Greg [mailto:Pond.Greg@epa.gov]  
**Sent:** Wednesday, April 03, 2013 9:43 AM  
**To:** Dolan, Mary; Jackson, Susank  
**Cc:** Symborski, Mark; Van Ness, Keith; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

Mary, within the powerpoint sent (titled BCG and IBI correspondence) there is text describing aspects of TenMile Creek in relation to others (slides 3-5). If viewed as a slide show, the notes will not appear. Also in the conclusion of the report, I think bullet further 5 describes some rationale and evidence of why TMC is important and should be carefully planned. We intend to incorporate info from the data in the powerpoint slides into the report soon. Without a map, none of us ever saw the spatial context of where the 3 TMC sites were located (or any reach habitat or water chemistry data ) so what we have elaborated upon is fairly basic (and without describing to you individual species level info filled with aquatic ecology jargon).

This is a final draft for now and we will send it out to all of the panelists for critical review. We will not be sending you any revisions until we've made them based on experts' review. We would like to add a lot more detail on TMC, but we as authors just didn't have anything else to go on from the quick workshop last week. At some point, it would be good to analyze data from several more subwatersheds within TMC to get a more complete picture.

*Greg Pond*  
U.S. EPA Region III  
Office of Monitoring and Assessment  
Freshwater Biology Laboratory  
1060 Chapline St.  
Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

---

**From:** Dolan, Mary [mailto:mary.dolan@montgomeryplanning.org]  
**Sent:** Wednesday, April 03, 2013 9:24 AM  
**To:** Jackson, Susank; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

I got it. Is this the final for now?

Please remember that the immediate use of this report (for Planning staff) is to understand the quality of the Ten Mile Creek sites in relation to the other sites and their place on the BCG. While I will be attaching the report, I only have one small paragraph relating to Ten Mile Creek from the report. I can prepare a map showing the location of the sites that were evaluated in the watershed, but I would like you to place the sites on the BCG continuum.

Can you elaborate a little on conditions in TMC and the differences between the mainstem sites 303band 304 and the King Tributary? You can do this outside the report.

Mary

---

**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]  
**Sent:** Wednesday, April 03, 2013 9:17 AM  
**To:** Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
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Susan Jackson

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**To:** Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
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Susan Jackson  
US EPA Biological Criteria Program

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## Jackson, Susank

---

**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Wednesday, April 03, 2013 11:44 AM  
**To:** Jackson, Susank; Dolan, Mary; Pond, Greg; Symborski, Mark  
**Cc:** Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis  
**Subject:** RE: Helps if I add the slides  
**Attachments:** Hydropsychidae.jpg

Hi Susan:

For the last slide – how about a rat-tailed maggot, *Hexatoma* sp. or *Cheumatopsyche* sp.? They can be found in nasty streams. Greg – what do you think? The rat tailed maggot makes quite an impression! Otherwise – the photos are very good! Attached is a clipped image of a *Hydropsychidae* larva.

Keith

---

**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Tuesday, April 02, 2013 6:10 PM  
**To:** Jackson, Susank; Dolan, Mary; Pond, Greg; Symborski, Mark; Van Ness, Keith  
**Cc:** Jeroen.Gerritsen@tetrattech.com; Reynolds, Louis  
**Subject:** Helps if I add the slides

---

**From:** Jackson, Susank  
**Sent:** Tuesday, April 02, 2013 6:08 PM  
**To:** 'Dolan, Mary'; Pond, Greg; 'Symborski, Mark'; 'Van Ness, Keith'  
**Cc:** 'Jeroen.Gerritsen@tetrattech.com'; Reynolds, Louis  
**Subject:** BCG slides tailored for Mo Co.

Mary – I just saw your email about report first thing tomorrow with graphics. Neither Greg or I are adept at adding graphics to the report without throwing off the formatting. We can get help on this tomorrow. There are some graphics in the report now but not the photos like these slides that show degradation along the gradient. However, if you like the story these slides communicate, we can get them included in the report tomorrow. You can also print them out as handouts, two per page, and insert them into the report. There are some more figures and graphs that Gregg is working on but will likely not be ready for tomorrow. They will be by next week though.

Greg and Keith: Please take a look at these, there are some notes in the note pages and a question for you both re the last slide which sure looks like a BCG level 6 to me --- and I would not expect fish in there. Greg, I know you thought we could combine both 5 and 6 but can you take a second look?

The petri plates are from a Maine, but the expectations for Mo Co would be similar, I think. Perhaps we can do some photos of actual piedmont invertebrates in petri plates for the final report.

Keith – we are literally throwing this document together and have had no real time to think and consult. If there are other photos you prefer, feel free to replace the existing ones.

Susan



---

**From:** Jackson, Susank  
**Sent:** Tuesday, April 02, 2013 2:14 PM  
**To:** Dolan, Mary; Pond, Greg; Symborski, Mark; Van Ness, Keith  
**Cc:** [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis; Pond, Greg  
**Subject:** Some BCG slides that may be useful

Mary, Mark and Keith:

Attached are some slides from previous use that you may find appropriate. Maine info and photos are shown but the basic info is relevant to Montgomery County (Mo Co). We can also replace and modify with Mo Co photos and examples.

Please take a look and let me know what might be useful. You are certainly welcome to extract what you want right now.

Two of the slides have animation (17 and last one).

Susan

---

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**To:** Pond, Greg; Dolan, Mary  
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Attached is a rough draft report that Susan, Jeroen, and I have been working on. We basically ran out of steam for now, but will be interested in your feedback and additions that dovetail into something meeting expectations for your hopes for a BCG and Tenmile Creek in particular. There are numerous placeholders for more information we need to flesh out (and Keith, you will see your name mentioned a few times and highlighted in yellow!). We think it would be great to

have site photos across the tiers with description of impervious area, etc., and then photos of key indicator taxa (e.g., Attributes I-III).

This has been a very interesting BCG exercise but we've never had to turn something around in a just a few days time like this. We would very much like to continue to work on BCG development for Montgomery Co., and this pilot has been a good start.

Please take a look and let us know where you'd like us to take this.

Greg

*Greg Pond*  
U.S. EPA Region III  
Office of Monitoring and Assessment  
Freshwater Biology Laboratory  
1060 Chapline St.  
Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

---

**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Monday, April 01, 2013 5:25 PM  
**To:** Jackson, Susank; Pond, Greg  
**Cc:** Symborski, Mark  
**Subject:** RE: Photos

Susan-

I'm leaving soon, are you sending something today? I'll either look at it later this evening from home or early in the morning.

Mary

---

**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Monday, April 01, 2013 4:55 PM  
**To:** Dolan, Mary; Jackson, Susank; Pond, Greg  
**Cc:** Curtis, Meosotis; Symborski, Mark  
**Subject:** RE: Photos

Still alive. Still here!

---

**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Monday, April 01, 2013 4:54 PM  
**To:** Jackson, Susank; Van Ness, Keith; Pond, Greg  
**Cc:** Curtis, Meosotis; Symborski, Mark  
**Subject:** RE: Photos

Mark and I are still in the office. I don't know about Keith.

Mary

---

**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]  
**Sent:** Monday, April 01, 2013 4:51 PM  
**To:** Van Ness, Keith; Pond, Greg  
**Cc:** Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** RE: Photos

Hello Keith and Mark,

Greg and I are near finish with a very rough draft of the report. Greg just had his phone lines taken down (repair work) so he is offline at the moment. We are writing up results and at least bulleting key conclusions.

I can send to you all shortly if you are still in office. Would like your feedback on whether we are heading in the right direction. Or, if too late, can send first thing in the morning. We plan to revise and clean up this very preliminary report before sending to you at end of the day tomorrow but wanted some initial feedback.

Susan

---

**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Monday, April 01, 2013 1:10 PM  
**To:** Pond, Greg  
**Cc:** Jackson, Susank; Curtis, Meosotis; Dolan, Mary; Symborski, Mark  
**Subject:** Photos

Greg:  
Here are some stream stations – hopefully they are illustrative of different habitat conditions. Bank001 – urban stream, img0059 – ag stream, hw308b – very nice stream, LSTM110 is a headwater stream in Ten Mile.  
Keith

## Jackson, Susank

---

**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Wednesday, April 03, 2013 2:24 PM  
**To:** Jackson, Susank; Pond, Greg  
**Cc:** St. John, Jennifer; Dolan, Mary  
**Subject:** Station locations  
**Attachments:** Station locations.xlsx

Susan:

Here is a spreadsheet with the locations of the different samples – including the ones for pre and post development. Jenny St. John is also making a map showing where the stations plot in the County. We'll be sending you a jpg within the hour. You could use the map in your powerpoint presentation – someone will be able to look at the map and intuitively get a sense of the disturbance in the station drainage area. Please let me know if we need to try and rate level of disturbance for each station as Mary requested originally. My opinion is that may best be done by the expert panel – certainly we have comments from them during the rating review about apparent disturbance based on the biological community.

Thanks  
Keith





## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Wednesday, April 03, 2013 2:57 PM  
**To:** Jackson, Susank; Pond, Greg  
**Subject:** RE: How about this one? slide #2

Yes!

---

**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Wednesday, April 03, 2013 2:30 PM  
**To:** Van Ness, Keith; Pond, Greg  
**Subject:** How about this one? slide #2

---

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Thanks  
Keith



## Jackson, Susank

---

**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Wednesday, April 03, 2013 3:41 PM  
**To:** Pond, Greg; Jackson, Susank  
**Cc:** St. John, Jennifer  
**Subject:** RE: Station locations

Hi Greg:

I'll get the imperviousness for the sites – although one problem would be ensuring the year of the land use coverage matches the monitoring was done – we will work on that. I can get rhab and physchem – no problem on that. Not as great a task as you may think! Jenny – do you think that Adam can get impervious surface % for us? He can pick his choice of stations to do field work if he can!

I agree that the draft report and all attachments (and ppts) should get out to the panelists real soon – a one week turn around may be tough but letting them know that at a minimum their review of the results and conclusions in the report is needed by the weeks time may keep their stress levels to a manageable level. I will get any other feedback to you asap but I hope that the primary customer for you becomes the state folks!

Thanks  
Keith

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**From:** Pond, Greg [mailto:Pond.Greg@epa.gov]  
**Sent:** Wednesday, April 03, 2013 3:11 PM  
**To:** Van Ness, Keith; Jackson, Susank  
**Subject:** RE: Station locations

Thanks Keith, and looking forward to the map.

I would say having a fairly precise measure of land covers (incl. impervious surface), RBP habitat metrics, and any water quality (pH, DO, conductivity) would be helpful to put into a principle components analysis (PCA) that derives sort of an aggregate stressor gradient (i.e., using PCA axis 1). We did something like that in PA to refine attributes and I use PCA a lot to make synthetic catch-all disturbance gradients. But the BCG tier level could be easily regressed along the PCA disturbance gradient. There we could see "dose response", but we would want to also correlate tier assignments to individual measures of %impervious, and indiv. habitat metrics too. If I had all of those data, I would jump into it. Getting your GIS folks willing to run that many sites for land cover and you extracting wq and habitat data for all sites would quite a task but necessary.

Last, what do you think Keith about sending this draft report and all the attachments including the ppts to all of the panelists in the next couple of days with, say, a week turnaround time? But before sending to them, Susan and I would really like any review feedback from you for the various pieces of the report. You're our primary customer on the technical side of this.

Bet you'd rather be out in the field sampling today ;o)

*Greg Pond*  
U.S. EPA Region III  
Office of Monitoring and Assessment  
Freshwater Biology Laboratory



1060 Chapline St.  
Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

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Thanks  
Keith

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Friday, April 05, 2013 11:26 AM  
**To:** Dolan, Mary; Jackson, Susank  
**Cc:** Pond, Greg  
**Subject:** RE: See slide number 2 for 10 Mile Creek Sites

That's good! We could do it but it would take some time.

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**From:** Dolan, Mary [mailto:mary.dolan@montgomeryplanning.org]  
**Sent:** Thursday, April 04, 2013 4:43 PM  
**To:** Jackson, Susank; Van Ness, Keith  
**Cc:** Pond, Greg  
**Subject:** RE: See slide number 2 for 10 Mile Creek Sites

It's probably not necessary unless it is easy to prepare.

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**Sent:** Thursday, April 04, 2013 4:41 PM  
**To:** Dolan, Mary; Van Ness, Keith  
**Cc:** Pond, Greg  
**Subject:** RE: See slide number 2 for 10 Mile Creek Sites

Hello Mary,

I am guessing you are asking for photos and highlight for BCG level 3 since we show a level 2 and then 4 and then 6 but no 1 or 5. The intent was to show the range of change in biota and sites with the materials that we had available. We used petri plate slide photos that we had in stock, which were these levels (approximately 2, 4, 6).

If you would like a photo and graphics put together that include level 3, that could probably be done by working with Keith and digging into their sample vials. But, I am not sure if the Mo Co biological assessment program has the photo capability to do petri plate photos.

Keith – what do you think?

Greg, any thoughts on your part? Do you have photo capability at your lab?

Susan

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**To:** Jackson, Susank  
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What about tier 3?

---

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**Sent:** Wednesday, April 03, 2013 2:52 PM

**To:** Dolan, Mary  
**Cc:** Van Ness, Keith; Pond, Greg  
**Subject:** See slide number 2 for 10 Mile Creek Sites

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There were no other Ten Mile Creek Sites evaluated, but the group hoped to do more in the future.

Susan

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**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Wednesday, April 03, 2013 12:16 PM  
**To:** Jackson, Susank  
**Subject:** RE: Please confirm you received the email with attachments

The BCG graphic would be helpful. Thanks.

---

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**Sent:** Wednesday, April 03, 2013 12:14 PM  
**To:** Dolan, Mary; Van Ness, Keith; Pond, Greg  
**Cc:** Symborski, Mark; Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

Hello, I just got out of a long meeting and catching up on emails.

The slides in the BCG/IBI comparison show where the 10 Mile Creek slides fall – recalling from memory, they were in a good quality category.

There is text in the report that discusses 10 mile creek sites including the potential for reintroduction of brook trout.

I can place the 10 mile creek sites on a BCG graphic if you would like. Let me know.

Susan

---

**From:** Dolan, Mary [<mailto:mary.dolan@montgomeryplanning.org>]  
**Sent:** Wednesday, April 03, 2013 10:15 AM  
**To:** Van Ness, Keith; Pond, Greg; Jackson, Susank  
**Cc:** Symborski, Mark; [Jeroen.Gerritsen@tetratech.com](mailto:Jeroen.Gerritsen@tetratech.com); Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

Thanks- I will see what I can pull from the slides.

Mary



---

**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Wednesday, April 03, 2013 9:47 AM  
**To:** Pond, Greg; Dolan, Mary; Jackson, Susank  
**Cc:** Symborski, Mark; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

If I can help let me know – I think you and Susan have earned several weeks of well deserved rest. Again – thanks for all of this work – the report exceeds everything that I had hoped for!

Thanks  
Keith

---

**From:** Pond, Greg [<mailto:Pond.Greg@epa.gov>]  
**Sent:** Wednesday, April 03, 2013 9:43 AM  
**To:** Dolan, Mary; Jackson, Susank  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

Mary, within the powerpoint sent (titled BCG and IBI correspondence) there is text describing aspects of TenMile Creek in relation to others (slides 3-5). If viewed as a slide show, the notes will not appear. Also in the conclusion of the report, I think bullet further 5 describes some rationale and evidence of why TMC is important and should be carefully planned. We intend to incorporate info from the data in the powerpoint slides into the report soon. Without a map, none of us ever saw the spatial context of where the 3 TMC sites were located (or any reach habitat or water chemistry data ) so what we have elaborated upon is fairly basic (and without describing to you individual species level info filled with aquatic ecology jargon).

This is a final draft for now and we will send it out to all of the panelists for critical review. We will not be sending you any revisions until we've made them based on experts' review. We would like to add a lot more detail on TMC, but we as authors just didn't have anything else to go on from the quick workshop last week. At some point, it would be good to analyze data from several more subwatersheds within TMC to get a more complete picture.

*Greg Pond*  
U.S. EPA Region III  
Office of Monitoring and Assessment  
Freshwater Biology Laboratory  
1060 Chapline St.  
Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

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**Sent:** Wednesday, April 03, 2013 9:24 AM  
**To:** Jackson, Susank; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** RE: Please confirm you received the email with attachments

I got it. Is this the final for now?

Please remember that the immediate use of this report (for Planning staff) is to understand the quality of the Ten Mile Creek sites in relation to the other sites and their place on the BCG. While I will be attaching the report, I only have one small paragraph relating to Ten Mile Creek from the report. I can prepare a map showing the location of the sites that were evaluated in the watershed, but I would like you to place the sites on the BCG continuum.



Can you elaborate a little on conditions in TMC and the differences between the mainstem sites 303band 304 and the King Tributary? You can do this outside the report.

Mary

---

**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]  
**Sent:** Wednesday, April 03, 2013 9:17 AM  
**To:** Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** Please confirm you received the email with attachments

I had a horrendous tussle with Workplace trying to get the draft report and attachments sent - took me 25 minutes to get this down between the system freezing and booting me out.

Please confirm if you have received the report and successful in opening.

Susan Jackson

---

**From:** Jackson, Susank  
**Sent:** Wednesday, April 03, 2013 9:14 AM  
**To:** Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** Draft Report and attachments

Good morning. Attached is the draft report with two attachments (BCG and IBI comparison and Appendix B).

The report is preliminary. Your review comments are requested. We would like to finalize this report over the next month based on review by you and by the panelists.

Keith - can you review this report with a focus on the results and conclusions, provide us comments and then we can send to the expert panel for their review. Please email directly to Greg Pond and cc me. Greg is the "go to" technical person for this effort.

Both Greg and I will be available by email today if there are any changes or questions any of you on this draft. You may have some questions, edits or requests for further information for your meeting with the planning board tomorrow.

One last thing: If I recall correctly, there is a meeting next week. If you need a more final document by next week, please let us know. We can get the current draft cleaned abit more as well as the attachment formatted and incorporated directly into the body of the report. We would just need to know the timeframe.

Susan Jackson  
US EPA Biological Criteria Program

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## Jackson, Susank

---

**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Wednesday, April 10, 2013 1:56 PM  
**To:** Jackson, Susank; Pond, Greg  
**Cc:** mary.dolan@montgomeryplanning.org; mark.symborski@montgomeryplanning.org  
**Subject:** RE: FOLLOW UP RE: See slide number 2 for 10 Mile Creek Sites

Hi All:

I was out yesterday. Catching up to my email now. First – no comments on the draft report – I would think the expert panel will be very eager to read it and consider the implications.

Mary asked me to attend the Planning Board meeting tomorrow and present a 5 minute intro into the BCG. I can do it – but would like permission to use your, Greg's and Lou's ppt slides (some of them). It will be very short, from a laypersons point of view, and try to explain how the BCG provides very useful information to decision makers on the affects of land use change – information that our IBI does not provide.

I would welcome any suggestions including if you all do not think I should do this given my limited experience in the BCG. I am passionate though in the need to provide timely, understandable and accepted natural resources information to the decision makers on implications of different land use scenarios – and that the BCG is an excellent tool to provide that information.

Keith

---

**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Tuesday, April 09, 2013 1:40 PM  
**To:** Pond, Greg; Van Ness, Keith  
**Cc:** mary.dolan@montgomeryplanning.org; mark.symborski@montgomeryplanning.org  
**Subject:** RE: FOLLOW UP RE: See slide number 2 for 10 Mile Creek Sites

I think including the graphs you provided comparing BCG assignments and IBI scores is very useful with expanded discussion on interpretation and implications of the comparisons including questions to evaluate with larger data set. If you can incorporate the figures and discussion into the report, great. If formatting is an issue, keep placeholder as is now within the report and keep graphs and discussion in separate file. Sounds like you have limited time and need to prioritize on content rather than format.

I will look at the draft report this afternoon and will follow up.

Keith, any comments on the draft report and suggested edits, addition, etc?

Susan

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**From:** Pond, Greg  
**Sent:** Tuesday, April 09, 2013 1:27 PM  
**To:** Jackson, Susank; Van Ness, Keith  
**Cc:** mary.dolan@montgomeryplanning.org; mark.symborski@montgomeryplanning.org  
**Subject:** RE: FOLLOW UP RE: See slide number 2 for 10 Mile Creek Sites

Hi Susan, I have been thrown into another project and have not got back into the draft report. I was thinking about incorporating a few of the data graphs into the results section (B-IBI vs BCG?). What do you all think?

I'd like to send this out to the entire group of panelists for review and comment by Friday. Thoughts?

*Greg Pond*

U.S. EPA Region III  
Office of Monitoring and Assessment  
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**Subject:** FOLLOW UP RE: See slide number 2 for 10 Mile Creek Sites

Hi Keith and Greg,

Just checking in on two things:

1) Keith, I am presuming you are saying you could do petri plate photos specific for the Piedmont straw BCG, with focus on petri plates showing samples from Ten Mile Creek? That is great, if so. What could be the timeframe considering everything else you are doing?

2) Keith and Greg, any more revisions to the first rough draft? Suggest the draft be sent out to the technical expert workgroup for review and comment as soon as you are finished with any updates or revisions.

3) Do you want to talk about next steps at some point? Let me know. I am here this week but next week wrapped up in a meeting Tuesday through Thursday.

Mary, Mark, or Keith: are you willing to share with me and Greg the materials you have put together for the meeting with the planning board on Thursday? If so, are they scannable and could be emailed? That would be helpful in thinking in future about what you think is useful to communicate and how.

Thank you,

Susan Jackson

---

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**Sent:** Wednesday, April 03, 2013 9:17 AM  
**To:** Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** Please confirm you received the email with attachments

I had a horrendous tussle with Workplace trying to get the draft report and attachments sent - took me 25 minutes to get this down between the system freezing and booting me out.

Please confirm if you have received the report and successful in opening.

Susan Jackson

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**From:** Jackson, Susank  
**Sent:** Wednesday, April 03, 2013 9:14 AM

**To:** Dolan, Mary; Pond, Greg  
**Cc:** Symborski, Mark; Van Ness, Keith; [Jeroen.Gerritsen@tetrattech.com](mailto:Jeroen.Gerritsen@tetrattech.com); Reynolds, Louis  
**Subject:** Draft Report and attachments

Good morning. Attached is the draft report with two attachments (BCG and IBI comparison and Appendix B).

The report is preliminary. Your review comments are requested. We would like to finalize this report over the next month based on review by you and by the panelists.

Keith - can you review this report with a focus on the results and conclusions, provide us comments and then we can send to the expert panel for their review. Please email directly to Greg Pond and cc me. Greg is the "go to" technical person for this effort.

Both Greg and I will be available by email today if there are any changes or questions any of you on this draft. You may have some questions, edits or requests for further information for your meeting with the planning board tomorrow.

One last thing: If I recall correctly, there is a meeting next week. If you need a more final document by next week, please let us know. We can get the current draft cleaned abit more as well as the attachment formatted and incorporated directly into the body of the report. We would just need to know the timeframe.

Susan Jackson  
US EPA Biological Criteria Program

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## Jackson, Susank

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Wednesday, May 01, 2013 4:34 PM  
**To:** Jackson, Susank  
**Subject:** RE: Benthic Samples


Hi Susan:

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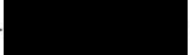
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Susan and Greg:

I have to prepare a written proposal and submit it to my management. I hope they will be okay with it. I will get it done this week.

Thanks

Keith

Oh – Susan, did you receive the benthic macroinvertebrates from Ken Mack?

Thanks

Keith

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**Sent:** Sunday, May 12, 2013 10:32 PM  
**To:** Van Ness, Keith; Jackson, Susank  
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Thanks, Keith. I hope your management will consider this and we can start thinking about this soon.

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**Subject:** RE: Benthic Samples

Sure, I will be glad to help you develop a scope of work.

Any update on results from the planning meeting? IS the scope of work because they gave you the thumbs up for moving ahead on the BCG? Labor only or are resources involved? I have requested some funding for supporting a workshop but no word on budget yet. We are going through significant cuts but should know soon what funds I might have available.

When is a good time to pick up the vials? Are the samples in alcohol or formaldehyde?

Thanks,

Susan

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**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Wednesday, May 01, 2013 4:02 PM  
**To:** Jackson, Susank  
**Subject:** RE: Benthic Samples

Hi Susan

I will swap you – all the vials you can carry if you can help me develop a scope of work to develop a BCG for Montgomery County, Maryland. Please call or email and let me know what you think. I should have called you much earlier – Ten Mile Creek is really consuming my time now. Also – I will not be retiring any time soon!

Keith

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**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]  
**Sent:** Wednesday, May 01, 2013 2:40 PM  
**To:** Van Ness, Keith  
**Subject:** Benthic Samples

Hello Keith,

When we met at the workshop last month, I asked about sample vials from the streams that your program has collected and may no longer need. You indicated that you do have a large supply of sample vials that are no longer needed. I use these vials in our WQS Academy for the biological criteria module as well as, on occasion, when volunteering in the schools.

If you have additional sample vials available, please let me know and I will come up to pick them up.

Susan Jackson



## **Jackson, Susank**

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**From:** Van Ness, Keith <Keith.VanNess@montgomerycountymd.gov>  
**Sent:** Monday, May 13, 2013 12:03 PM  
**To:** Jackson, Susank; Pond, Greg  
**Subject:** RE: Proposal for Ten Mile Creek BCG

Thanks Susan! I will keep you all posted, keep your fingers crossed.  
Keith

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**From:** Jackson, Susank [mailto:Jackson.Susank@epa.gov]  
**Sent:** Monday, May 13, 2013 11:59 AM  
**To:** Van Ness, Keith; Pond, Greg  
**Subject:** RE: Proposal for Ten Mile Creek BCG

Hello Keith,

Let me know how it goes. I am out on furlough this week but will be checking email.

With our funding, and Greg's commitment to assist, we can proceed incrementally and by late June begin work on first phase. I need to write a work assignment for the first part that we can support (I will have to take a look again and see how far \$15K will go and discuss with Jeroen).

Susan

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**From:** Van Ness, Keith [Keith.VanNess@montgomerycountymd.gov]  
**Sent:** Monday, May 13, 2013 10:32 AM  
**To:** Pond, Greg; Jackson, Susank  
**Subject:** RE: Proposal for Ten Mile Creek BCG

Susan and Greg:

I have to prepare a written proposal and submit it to my management. I hope they will be okay with it. I will get it done this week.

Thanks

Keith

Oh – Susan, did you receive the benthic macroinvertebrates from Ken Mack?

Thanks

Keith

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**From:** Pond, Greg [mailto:Pond.Greg@epa.gov]  
**Sent:** Sunday, May 12, 2013 10:32 PM  
**To:** Van Ness, Keith; Jackson, Susank  
**Subject:** RE: Proposal for Ten Mile Creek BCG

Thanks, Keith. I hope your management will consider this and we can start thinking about this soon.

Susan, I will contact Jeroen soon, heading to KY this week. Hope Denver is nice this time of year!

*Greg Pond*



U.S. EPA Region III  
Office of Monitoring and Assessment  
Freshwater Biology Laboratory  
1060 Chapline St.  
Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

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**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Friday, May 10, 2013 10:09 AM  
**To:** Jackson, Susank; Pond, Greg  
**Subject:** RE: Proposal for Ten Mile Creek BCG

Susan and Greg:

I hadn't read the proposal Susan attached before I sent my earlier emails – I was just so excited that you all wanted to help on this. So my question about using MBSS data and inviting them to participate is well answered! I'd like to invite MDE as well.

Thanks  
Keith

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**From:** Van Ness, Keith  
**Sent:** Friday, May 10, 2013 9:47 AM  
**To:** 'Jackson, Susank'; Pond, Greg  
**Subject:** RE: Proposal for Ten Mile Creek BCG

To All:

Thank you all so much! I will share with my supervisor and Department Head. One thing – we would like to do this for the entire county. If agreeable with you, perhaps we could use MBSS data as well and demonstrate how data from different monitoring programs can be integrated together? Just a thought!

Again – thanks so much!  
Keith

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**From:** Jackson, Susank [<mailto:Jackson.Susank@epa.gov>]  
**Sent:** Friday, May 10, 2013 1:21 AM  
**To:** Pond, Greg; Van Ness, Keith  
**Subject:** RE: Proposal for Ten Mile Creek BCG

Glad to hear you can step in and take a lead role. Jeroen is in office tomorrow, oops, actually, today (Friday). Give Jeroen a call to hear from him how he sees your role.

Keith, what do you think? Between EPA HQ (\$15K of the \$45K) and EPA Region 3 (in kind services equivalent to \$12K), can the county come up with the remaining and subcontract with Tetra Tech?

I am flying out to Denver tomorrow. I will be away all of next week but checking my email.

Susan

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**From:** Pond, Greg  
**Sent:** Thursday, May 09, 2013 9:57 PM  
**To:** Jackson, Susank; Van Ness, Keith  
**Subject:** RE: Proposal for Ten Mile Creek BCG

Hi Susan and Keith,

This workplan looks good and includes all the features we would need to develop a robust BCG model. Count me in as playing a lead role as you might see fit. Looks like it could save them some money with my involvement. I'm sure Lou will be interested too. I will be discussing with our team next week to see if any others might find time to work on aspects of this.

Greg

*Greg Pond*

U.S. EPA Region III  
Office of Monitoring and Assessment  
Freshwater Biology Laboratory  
1060 Chapline St.  
Wheeling, WV 26003  
Ph: 304-234-0243  
[pond.greg@epa.gov](mailto:pond.greg@epa.gov)

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**From:** Jackson, Susank  
**Sent:** Thursday, May 09, 2013 5:30 PM  
**To:** Van Ness, Keith; Pond, Greg  
**Subject:** Proposal for Ten Mile Creek BCG

Attached is a proposal for what it would take for TT to provide technical assistance to develop a BCG (\$45K). Jeroen indicated that if Greg and/or others in Region 3 can provide assistance and take a lead role, the estimate could go down to \$33K of TT costs, saving about \$12K.

I am able to provide \$18K to support this effort - \$3K of this goes to my contract overhead and work assignment management. This means \$15K would actually go to BCG work. If Greg can take on a lead role working with Jeroen, that leaves \$18K for Mo Co to subcontract with TT.

Greg, Jeroen will be in office tomorrow if you want to inquire re what he would expect you to do to realize the savings. I know you are over extended right now, so understand if you not able.

Time frame – this summer and fall, work done by November 30 ( at least for the work supported by USEPA funds, this is when our contract ends).

Your thoughts?

Susan

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**From:** Van Ness, Keith [<mailto:Keith.VanNess@montgomerycountymd.gov>]  
**Sent:** Wednesday, May 01, 2013 4:34 PM  
**To:** Jackson, Susank  
**Subject:** RE: Benthic Samples

Hi Susan:

May 9 is the next Board Meeting on Ten Mile Creek. Already we are getting some interesting statements and counterclaims going from the developers.

I was allowed about 10 minutes during a 2 hour presentation to introduce the BCG concept at the last Planning Board Meeting. I had to really shorten the length of the powerpoint presentation you had developed. In the end, I presented a county map showing stream conditions and explained that our current way of assessing streams just does that – it does not address sensitivity or fragility of a stream. I told the Board that the BCG does do that and is a tool that we need in the county. I then used the slide of where the 3 Ten Mile Creek stations plotted on the curve and also the slide that Greg have made that compared our IBI to the BCG tiers. Some really got it, but I think I confused others. Maybe it is time for a better explanation of the BCG to be presented to either the Board or the Council.

The scope of work is because my Department head (Bob Hoyt) wanted to know the possible cost of doing one and the benefit. So – the scope would have labor and resources included. I don't believe I can adequately convey the importance of doing a rigorous BCG so any you can provide help would be greatly appreciated. We would have an opportunity to invite experts from the Department of the Environment and Natural Resources to participate and demonstrate the benefit of doing this state wide.

When do you need the vials? I will be up in the Ten Mile Creek watershed Thursday and maybe Friday of this week.

Call me on my cell if need be – [REDACTED]  will get the vials to you.

Thanks  
Keith

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